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Mining Electrical Engineers

TWENTY-EIGHT years ago the Association of Mining Electrical Engineers was founded broadly to minimise the risks attending the application of electricity to the mining industry by securing the adoption of improved methods and devices to increase safety in collieries, and by raising the efficiency and status of its members.

The sincerity of purpose which characterise its endeavours are evident, while the support accorded the Association by representative individuals and official bodies who influence mining policy and guide electrical interests is plain evidence that its efforts are viewed with approbation. The A.M.E.E. is a vigorous organisation with an increasing membership, now approaching 2,300, distributed among twelve branches and five sub-branches.

Far-reaching changes have taken place, and others are pending, in the applications of electric power and illumination to mining operations. The legislative element is growing: the electrical inspectorate has been enlarged; comprehensive official testing facilities and certification of plant have been established. Extensive inquiries are now being conducted by the Royal Commission on Safety in Mines as a preliminary to instituting methods for the more adequate training of men with the object of assuring the electrical, as well as general, competency of mining personnel.

In all these matters the Association is playing its part. From the first it has attached considerable importance to technical and practical capabilities. It has set a high standard for its own examinations and has carried the subject of certification of men as far as it can be taken for the present. In addition, mechanical proficiency is to be fully explored, for colliery electricians need to be skilled mechanics too.

Whether certification should come from the Government or from an outside source is debatable, for the imposition of two tests might complicate the essentially simple procedure of professional examination which is already well recognised in many other spheres.

How necessary all this is, is indicated in some degree by the detailed analysis of electrical accidents and their causes which formed the subject of the presidential address at the A.M.E.E. Convention at Southport last week. It is necessary to emphasise how small a fraction (0.027 per cent.) electrical mishaps are of the total.

There is no desire to minimise the importance of the risk that the utilisation of electricity does introduce, to seek excuses for the accidents that do occur, or to depreciate sustained and vigorous efforts to reduce that risk. What is necessary is the realisation that very few indeed, if any, electrical accidents can be described as unpreventable, though a relatively small proportion may be unforeseeable.

The indisputable fact remains that factors which contribute to electrical accidents are largely controllable. No matter how good are the materials employed, or how skilful is the design of equipment, or how carefully it is made, complete safety will not be achieved if the plant is not adequately maintained and kept in proper working order.

In Mr. Horsley's opinion the organisation is at fault in failing to provide for trained and intelligent direction of the work. Modern conditions require conscientious supervision by engineers with specialised training and ripe experience. Such control can only become effective when it has the requisite confidence of the management enabling the necessary authority to be delegated.

Mining electrical engineers know which road they want to travel; they are moving along their chosen way and by electing Mr. Horsley as their president they have, so to say, "put the policeman in the chair." It is an unusual position for a Government official to find himself in, but Mr. Horsley well deserves the compliment implied in his election.

The L.C.C. Objects

UPON the recommendation of its Public Control Committee the London County Council is lodging an objection to the proposals for reorganising electricity distribution circulated by the Minister of Transport. While recognising the urgent necessity for reorganisation the Council cannot support the proposals for several reasons, the principal being that they would set up or preserve differing and conflicting types of organisations; that they favour private companies as against municipal undertakings, when electricity should be conducted as a public service at minimum cost to the consumer; and that the industry would still be divided up among too many organisations—eight in the Administrative County of London and 22 in Greater London. The "White Paper" also received severe criticism at the annual conference of the Urban District Councils Association last week when it was decided to oppose the handing over of municipal undertakings to private companies, particular exception being taken to the direction to the Electricity Commissioners to give preference to amalgamations on Basis A—the acquisition by one undertaker of existing undertakings in the area covered by a scheme.

Trolley-Buses to the Fore

ALTHOUGH not wholly favourable towards trolley-buses the discussions at last week's conference of the Municipal Tramways and Transport Association at Portsmouth at least showed that this type of vehicle is receiving more attention. In his presidential address Mr. C. Owen Silvers, general manager at Wolverhampton, said that reasonable power charges were essential for any material extension of their use. Mr. B. Hall (Portsmouth) considered that the modern trolley-bus could effectively cater for any area served by a tramway and deal with any urban demand, but Mr. A. Baker (Birmingham) thought they were only suitable for small towns on account of difficulty in transferring them to meet traffic conditions. Is Portsmouth then a "small" town?

Revised Lamp Specification

WHILE discharge lamps have attracted more public attention during the past few years, tungsten-filament lamps for general service have been steadily improved, if in a less spectacular manner, and a revision of the appropriate British Standard Specification has been needed. This is now available in the form of No. 161—1937. Probably the most interesting innovation is the exploitation of the proportionate relationship that the small reduction in light during the 1,000-hour life of a modern lamp bears to the number of running hours. The average value is now defined in lumens per watt after 500 hours of operation and is taken as the mean of two measurements at 400 and 600 hours, thus lessening the photometric work. The performance of coiled-coil lamps, which were the subject of an addendum two years ago to the 1934 edition, has been tightened up in accordance with recent manufacturing progress. A new appendix giving calculations of standard deviation and coefficient of variation is to be welcomed. Apart from such modifications the new edition appears to have the merit of being simpler and better arranged than its predecessor.

Irish Lamps

IT was announced a month or so ago that the competition of imports had compelled the Irish Free State lamp factory to close. Now it is stated that Solus Teoranta, the company owning the factory, has undertaken to produce lamps of a quality equal to that of the "English Combine" at no higher price, and on this understanding the Government is to prohibit the importation of certain types of filament lamps save under licence. This seems to go much further than necessary. In announcing the decision to close the works, the chairman, Mr. J. J. Walsh, said that it was due to the influx of cheap Japanese lamps and that the British Combine did not affect his company greatly, as they both produced lamps of virtually the same quality and price. It was stated at the time of the closing of the factory that the company was able to meet all the lamp needs of the Irish Free State, said to be a million of all types per annum.

The Battersea Collision

THE report of the official inquiry into the accident at Battersea Park on April 2nd, when one electric train ran into the rear of another, shows that the cutting off of power from the tracks involved was automatic and immediate. The coaches were of wood, but there was no fire, and it was submitted that the additional resistance afforded by all-steel bodies to impact would possibly have made things worse by causing derailment. It would appear from this that had electricity not been used for traction and other services the results might have been far more serious. The accident is ascribed to incorrect signalling, which included the unauthorised tampering by a signalman with sealed automatic gear. Lt.-Col. A. H. Mount, who conducted the inquiry, recommends that the Southern Railway should as rapidly as practicable extend the system of re-signalling on the colour-light system with continuous track circuiting, which is used in all the London terminal stations of the company except Victoria (Central side).

Progress in Palestine

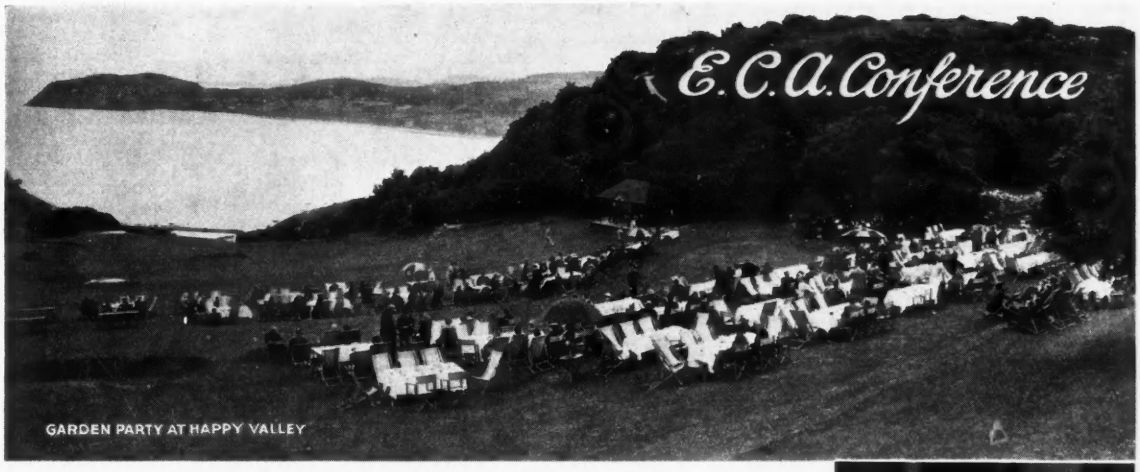
IN spite of the political difficulties in Palestine during the past few years electricity has continued to make headway fostered largely by British interest in the subject. An article in this issue includes figures illustrating the rapid growth of consumption; last year there was an increase of over 30 per cent. as compared with 1935. The Palestine Electric Corporation has spread its 22-kV system over a wide area and is contemplating further expansion. At a meeting to be held on July 15th a resolution for increasing the capital from £2,500,000 to £4,000,000 is to be considered.

Centralisation of Power

THE Minister of Transport (Dr. L. Burgin), in reply to a question asked in the House of Commons as to the danger in war time of concentrating large generation units in the centre of London, stated that the Minister for the Co-ordination of Defence had been consulted and had agreed with the proposal to extend the Battersea station by 100,000 kW. Indeed, the problem is not one of efficient production only; it is also a matter of coping with the demand within the limits of the physical space available. Power stations are, of course, much larger than they were a few years since, but station capacity is a relative matter having regard to the demand. Thus, a dozen years ago, Barking was the largest station with 120,000 kW installed; to-day it is still the largest with 387,000 kW, but the demand of the country has grown in about the same proportion. Moreover, the generating plant is now housed in two separate stations, A and B, and this represents a general tendency. The grid connection should give additional security, provided always that the local transmission or distribution system can be fed from it in the event of damage to the station due to aircraft, but whether this would be possible in all cases under present conditions is open to doubt.

Television and the Deaf

WHILE radio has undoubtedly done much to alleviate the lot of the physically afflicted, there is one large class of sufferers which it has been unable to benefit to any great extent. For the totally deaf television holds out possibilities of providing the kind of news and entertainment which is now given to others by sound programmes. The tests now being conducted at the Tower House Home, Erith, suggest that television may be able to fill a great gap in the lives of these people. It is hoped that a successful outcome of these tests will result in the B.B.C. so arranging its programmes that each session will contain at least one item that does not depend on sound.



Excellent weather helped to make the conference at Llandudno of the Electrical Contractors' Association and its allied bodies an outstanding success. The business side was notable for two good papers, which gave scope to a number of competent speakers. That the social functions went with a swing goes without saying.

THE conference proper opened on the morning of June 24th, when a civic welcome was given to the delegates by Councillor R. J. Gresley-Jones, who was obviously seriously concerned about the possibility of the Llandudno Urban District Council having, with similar authorities, to give up its undertaking as the result of reorganisation. After the reply to Mr. Gresley-Jones by the President, and the delivery by Mr. H. M. Drake of his presidential address, Mr. G. N. Walker, B.Sc., A.M.I.E.E., read his paper, "The Business of Electrical Contracting and Retailing, its Service and Organisation." The discussion which followed was a lively one, and the paper was subjected to a good deal of pointed but good-humoured criticism.

The second business session of the conference was held in the afternoon, when, following the presentation by Mr. W. Riggs of his paper on "Electrical Contracting and its Relations with Organised Labour," another very interesting discussion took place. A good deal of the two discussions related somewhat to both papers, and this fact was emphasised particularly by Mr. Marryat's direct comments on the morning paper in the afternoon discussion.

On June 25th the proceedings opened with the annual general meeting, when Mr. Drake presented his annual report, of which we give an outline. At this meeting an inscribed gold cigarette case was given to the President by the Council as a mark of appreciation of the good work which he had done during his year of office.

The final business session took place later on Friday morning, when Mr. H. E. Walker (Birmingham) was installed as President for 1937-38. In a short address Mr. Walker reminded his hearers that he had been a member of the Association since 1904, and he appealed for the confidence of the 1,700 members during the arduous times that lay before the Association. They were approaching another period of intense Parliamentary work, and the E.C.A. had to ensure that its interests were protected in whatever resulted from the McGowan Report. He appealed for renewed effort in the fight against shoddy work.

Mr. Drake said that Mr. Walker had been on the Council for seven years. He also announced that to make the President's work a little easier in future they had decided to have three vice-presidents, and those elected to assist Mr. Walker were Messrs. A. Smith (Bradford), Norman Aish (Bournemouth), and H. J. Galliers (Brighton). Votes of thanks were moved by the President to all who had contributed to the success of the conference, and this concluded the business sessions.

The Social Activities

The good humour which prevailed throughout the business aspect of the conference was reflected in the wholehearted enjoyment by all participants in the social activities. These opened on Wednesday evening, when, after most of the delegates and visitors had obtained their badges and programmes, they were received by the President and Mrs. Drake and the Vice-president and Mrs. Walker at the Grand Hotel. Afterwards, dancing continued until early morning.

On Thursday evening, members enjoyed to the full a smoking concert which had been arranged by Mrs. E. S. Lance (Llandudno), who combines a flair for concert organisation with an intimate knowledge of contractors' musical tastes.

It became known that the date coincided with the 52nd anniversary of the wedding of Mr. W. R. Rawlings ("father" and a founder member of the E.C.A.) and Mrs. Rawlings, and the President, on behalf of the Association, presented to Mrs. Rawlings a bouquet of flowers to commemorate the event. After the concert there was more dancing.

The garden party, which was held appropriately at Happy Valley on June 25th, was a very successful affair, at which it was evident that many E.C.A. members had not yet outgrown their schoolboy appetites for strawberries and cream. Their indulgences, however, did not damp their spirits in any way for the final function of the conference—the ball and cabaret at the Grand Hotel in the evening.

Mr. Walker's Paper

The paper by Mr. G. N. Walker on "The Business of Contracting and Retailing" was dealt with in our last issue. In the discussion which followed its presentation the author was told that his paper covered a type of contracting business far above the average size for this country, although in his reply to the critics he pointed out that an essential feature of his plan for the organisation of such a business was its flexibility; by simple modification any size of business could be

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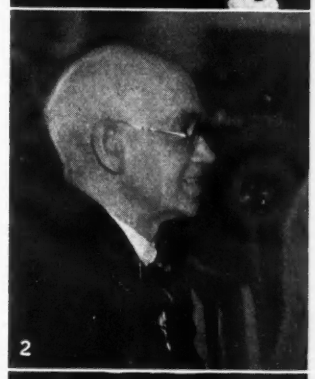
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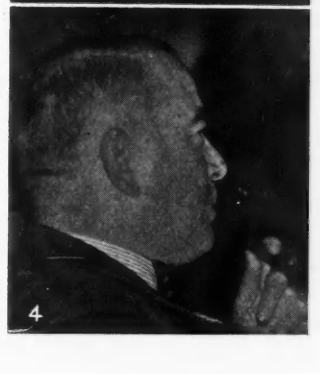
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Conference expressions: 1. Mr. G. N. Walker reading his paper. 2. Mr. W. Finlay (E.C.A. of Scotland). 3. Mr. H. Willoughby-Ellis (past-president). 4. Mr. H. C. Hazel (past-president)

catered for. There was no reason why one man should not hold all the positions shown in the table given in the paper, providing he had such a scheme of organisation in his mind.

Mr. J. Lightfoot (Manchester) estimated that the staff scheme presented by Mr. Walker would cost £6,000 a year—far too much for any ordinary contractor. To establish the magnificent showroom called for would account for another £3,000 a year.

Mr. H. F. Truman calculated that a staff of four persons was

Hilarity at the President's reception: Mr. and Mrs. Drake, Mr. Penwill and Miss M. Cross

suitable for a business with a turnover of £20,000 a year. But Mr. H. A. Lingard asserted that with proportionate overhead and material costs the total staff costs—£6,000 or any other figure—need not be worried about.

Mr. H. T. Young, President I.E.E., could not agree with the author in associating the estimators and draughtsmen with the sales department. Such staff members belonged essentially to the engineering side and he thought that wrongly placing them in the table would tend to arouse friction. Unfriendly criticism by one staff member of another in the same organisation was bad and the cause should be eliminated immediately.

Mr. H. Marryat thought that Mr. Walker had rather slurred over the development period between the one-man business and that represented by, say, the £6,000 a year staff organisation, and he believed that the solution of that problem was to be found in the indentured apprenticeship scheme dealt with in Mr. Riggs's paper.

Many members could not see eye to eye with Mr. Walker on the question of contractors' service, and Mr. Truman said it would be a mistake for the contractor to make himself too unapproachable to his customers. Similarly, Mr. Lightfoot saw success depending almost entirely on personal service, and he felt that the contractor who was not prepared to attach adequate importance to this question could say farewell to his business. It was only by such service, said Mr. Lingard, that electricity's contribution to lightening work in the house could be impressed upon customers. Contractors should do more "follow-up" work with service to their clients.

Mr. Walker's reply to these personal service criticisms was very much to the point. When a business had grown past a certain phase, it was obviously impossible for the proprietor to see all or many of his customers, and if his staff were not capable of personal contact with the customers in his stead then he had not chosen the staff correctly.

In connection with staff interviewing, Mr. John Walsh (Blackburn) added weight to Mr. Walker's comments on the necessity of keeping appointments, and urged his fellow contractors to be more punctilious in this matter. He was not altogether in agreement with the author on the service to architects, however, and he ridiculed the idea of the contractor making a charge to any architect. Views were rather varied on the subject of showrooms, too, and to take two strongly expressed cases, Mr. Truman asserted that a properly looked-after showroom was a paying proposition and that any contractor without a showroom was not doing his duty, while Mr. Lightfoot was definite on the point that showrooms in the North Country did not pay.

Mr. T. W. Heather (G.E.C.) had a good word for the well-stocked display window in which the customer could see the domestic equipment that he wanted without going into the shop, while Mr. Truman could not agree with price ticketing and thought it would be better to display with expensive apparatus something emphasising the necessity of such apparatus to the customer. Mr. Walsh said that in his showroom no displayed price meant no business.

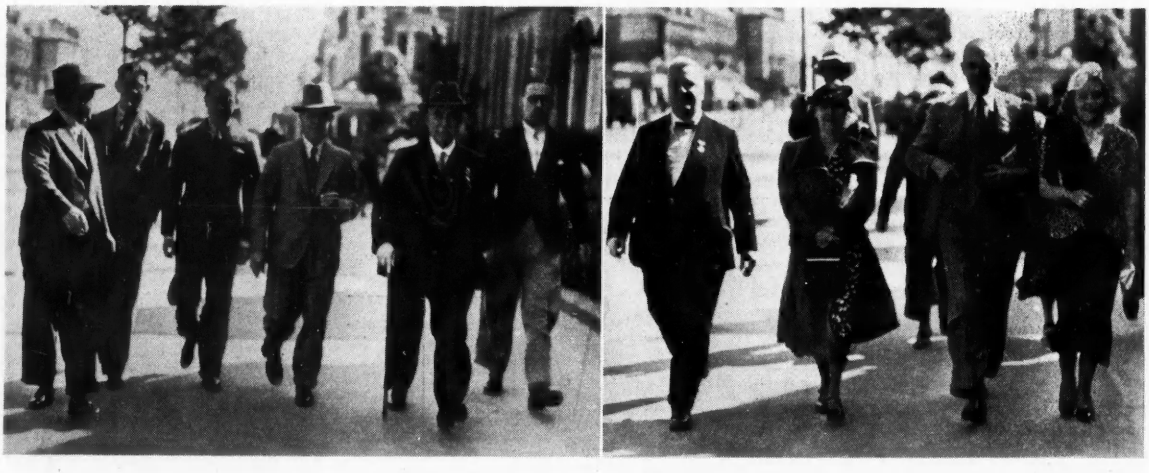
Many contractors must have been encouraged by Mr. Heather's comments on the distribution of merchandise. He declared that such distribution through the contractors compared favourably with that through other channels, and said that the contractors had the ball at their feet and all they had to do was to kick hard. Development of the merchandising side, he said, would undoubtedly help the contracting side of the business.

In connection with Mr. Walker's treatment of the training of assistants, Mr. W. J. Jones (E.L.M.A.) stressed the subject of light measurement. Every salesman should possess a light meter for use professionally as a doctor used a clinical thermometer. For demonstration rooms and in lecture halls Mr. Jones commended a simple apparatus which he showed with good effect. The indicator portion of a portable light meter is embodied in a screen projector. The light meter proper is carried where required about the room, so that the light value is indicated on the screen.

Mr. Riggs's Paper

In the course of the discussion on the paper by Mr. Walter Riggs on the relations between contractors and organised labour, Mr. H. Marryat said that boys for apprenticeship should be very carefully selected and there should be a large number to choose from. This meant the offering of educational facilities. Under his own scheme boys had to remain at school till they were sixteen, when they had to pass an intelligence test and present credentials as to good character. Each apprentice had a book in which his supervisor ticked off points weekly—mainly for reliability. At the end of a four-year course supervisors were selected from the boys. Such a scheme provided for the growth of staff in the development of the one-man business.

Mr. A. G. Bruty (Dublin) also backed indentured apprenticeship. The boy should feel that he was personally bound and *vice versa*. He had noticed a low standard of general edu-



Delegates on their way to the Winter Gardens

The "Electrical Review" Camera at the Contractors' Conference

1. Messrs. W. Cross and R. A. Harrison-Watson. 2. Mr. and Mrs. W. R. Rawlings. 3. Messrs. H. T. Young (President I.E.E.) and G. F. A. Norman. 4. A coffee-interval group including Mr. J. W. Mayall, Mr. and Mrs. C. R. Spouge and Mr. J. P. Loosemore. 5. Mr. and Mrs. A. G. Bruty. 6. The President with his presentation cigarette case in action, the Director assisting. 7. Messrs. C. W. Sully (E.L.M.A.) and S. Goldman. 8. Messrs. H. Willoughby-Ellis, E. T. Meyer, R. L. Booth, H. J. Galliers and W. Riggs. 9. Messrs. A. Holmes, R. W. Smith, J. D. Nettleton, S. B. Hopkins, G. R. Chard, H. C. Sabine, F. C. Vine and K. R. Mackley. 10. Mr. Norman Aish with the ladies. 11. Three past-presidents—Messrs. H. J. Cash, W. Riggs and W. H. Walton

cation among apprentices. A boy of fourteen should pass to a continuation class of some sort before entering any trade, and it was important that the apprentice should attend technical classes. He thought that the recruiting of youths was the most important subject dealt with in Mr. Riggs's paper and

Mr. Drake delivering his address. On his right is Councillor R. J. Gresley-Jones, who welcomed the delegates to the town

said that he considered the E.C.A. was weak on this point.

In reply to the assertion by Mr. W. Cross (Newcastle) that giving the lad his "lines" at twenty-one worked as well as indenturing, Mr. Riggs wanted to know why, if indentures and "lines" amounted to the same thing, the boy could not have them at the beginning. The President thought that even if the unindentured scheme did work well in some districts it left the door open for the unjust employer.

Messrs. T. E. Alger and T. C. Riggs

Although Mr. Lightfoot could not agree with indenturing he was in favour of registering apprentices and Mr. W. Finlay (Edinburgh) pointed to the successful system in Scotland which was a sort of cross between the two schemes of apprenticeship, but with registration. Mr. Riggs said that registration of apprentices would reduce the boy labour problem to a simple dual classification scheme—indentured apprentices and boy labour.

The major part of the discussion on registration, however, related to the fully trained operative, and Mr. Cross expressed himself in favour of this, although he thought that such a scheme would take a long time to get into operation. When the E.C.A. called for a return on this question the members did not support the Association well. Mr. H. J. Cash (London) thought that before registration of operatives was brought about something must be agreed upon on the question of bad workmanship. He could not agree that legislation was necessary on this point, and he was sure that if the whole industry went forward together a code of wiring could be obtained in a very short time. But Mr. Riggs contended that it would be only when the operative knew that all depended on him that safety to the public would be ensured. Registration of the operative would carry a great deal more weight than registration of the contractor.

Mr. L. C. Penwill (Director E.C.A.), referring to registration of contractors, said that he could not visualise any government giving recognition to any one body but safety demanded action by the Government. Mr. Lightfoot was severe on the supply men, who would not agree to registration, he said, because the wages they paid would not suit the higher skilled labour. But Mr. Cash thought it would be wrong to accept too hastily the answer of the I.M.E.A., because that body's policy seemed to vary considerably with changes of personnel of the Council. The Association of Supervising Electrical Engineers had taken up the issue and it was the duty of the E.C.A. to follow up the matter and invite the co-operation of all sections. Mr. W. Finlay suggested that it was illogical to expect the registration of operatives until the employers were registered.

Mr. Riggs's treatment of the grading and voluntary legislation questions was subjected to some criticism. Mr. Penwill thought the principle of different wage rates was wrong, and he strongly favoured wage rates which were based on ability rather than on area. Mr. W. Cross felt that Mr. Riggs had not stressed sufficiently the necessity of carrying out negotiations on a national scale. When grading was first set up transport difficulties were much greater and all concerned had a much more parochial outlook. To-day people thought nothing of working fifty miles away. He felt that the whole country could operate with two grades only and stressed that work was often cheaper when higher paid men were employed. Attention to the single rate throughout Scotland was drawn by Mr. Finlay, who also reminded his listeners that between 1926 and 1934 the employment rules in Scotland were not in vogue officially. But the fact was that as a "code of ethics" the members treated them more strictly. Mr. Cross saw in the likely success of the cotton industry's "experiment" a good chance for the legalisation of voluntary agreements.

The Annual Report

Satisfactory relations and negotiations with other sections of the industry were reported by Mr. Drake in his annual report. This was particularly the case with regard to the supply section. In an increasing number of cases supply authorities were now confining their work to members of the E.C.A. and/or registered contractors. A clause in the Supply Regulations issued by the Electricity Commissioners should do much to remove anomalies, namely, that supply authorities must enforce upon their own wiring staffs the same regulations as were enforced upon contractors. The scheme of co-operation with the Metropolitan Electric Supply Co. continued to operate with increasing success, and in one circle the replacement of the company's main fuses was now being undertaken by contractors.

A reference was made to the special activities of E.L.M.A. owing to a large manufacturing concern having recently become a member of that Association, a considerable number of retailers having in consequence been recommended as 22 per cent. agreement holders. Constant and close touch had been maintained with the C.M.A. on account of the somewhat difficult questions which had arisen during the year, particularly the increase in prices and the reduction in the number of cable sizes available.

Leaving the Winter Gardens after a business session

Mr. H. E. Walker, the new president, congratulated by Mr. H. M. Drake

An important feature of the work with the E.T.U. had been the commencement of a draft of national working rules to apply throughout the whole of the country. Also approaches had been made to the Ministry of Labour in conjunction with the Union with regard to the legalisation of voluntary wage agreements. Mr. Drake reminded his members of their obligation to comply with all wage agreements between the N.F.E.A. and the E.T.U.

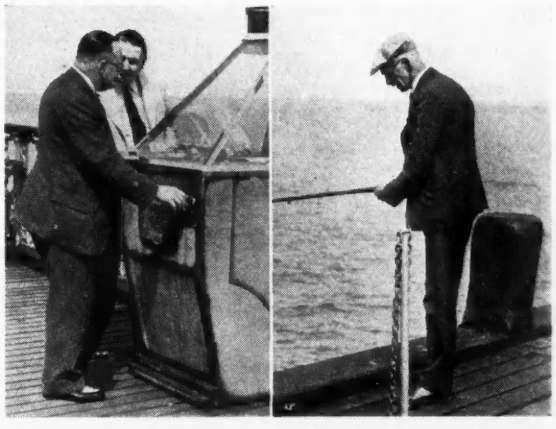
Referring to the many conferences which had been held with the National Register of Electrical Installation Contractors with a view to finding means for closer co-operation, the President said that it was an extremely difficult problem and that the scheme which had now been drafted by the joint committee could be considered as one possible solution.

A Manchester group at the garden party

While the good work which had been done by the Fair Trading Council continued, that body regretted that its findings were still not universally adopted by the industry. Many cases of unfair trading and "discount snatching" had been brought to light, and in nearly every instance where evidence had been procured the trader had been forced by the stoppage of supplies to return to equitable trading methods.

Steady progress was being made by the National Association of Radio Retailers which was formed last year to look after the interests of genuine radio dealers, and the Council of the new Association has been considering the question of part exchange values and hire-purchase trading. The articles of association now included a clause which entitled members to use the designation "Registered Radio Retailer." Another registration scheme was that introduced by the new National Association of Electrical Retailers whose object was to study the interests of all legitimate retailers of electrical equipment, whether or not they were electrical contractors. In this case members were entitled to use the term "Registered Electrical Retailer." The activities of Electrical Credit Services, Ltd., a company which had been formed to deal with hire-purchase transactions, would be confined to members of the N.E.C.T.A., although it was an entirely separate entity.

Referring to the McGowan Report and the "White Paper" Mr. Drake said that members could rest assured that their interests were being jealously guarded, and that the matter was under almost continual review. As the result of action by the Council, conditions were improving with regard to the many types of plugs and sockets on the market which did not comply with the relevant British Standard Specification, and members were advised when ordering plugs and sockets to state specifically on their orders that the accessories must comply with B.S.S. No. 546.



Trying their luck (or skill?). Left: Messrs. H. A. Deacon and K. Mackley. Right: Mr. F. Madge

Membership of the E.C.A. had increased during the year by 128, that of N.E.C.T.A. by 140 and of the N.F.E.A. by 131, in each case the number including second members. The total membership of each Association was now well over 1,700. There were now seventy-four main and subsidiary branches, and Southend, Croydon and Lancaster had been granted full branch status. One reason for improved attendance at the meetings was the arrangement by which an executive officer attended the branch meetings to explain at rather greater length the position of national affairs in so far as they affected each particular branch.

Mr. Drake reminded members of the circular which had been issued, asking them to inform the director of any local Parliamentary Bills which were being promoted. It was often found that in Bills which apparently did not concern the electrical industry clauses had been inserted which were definitely antagonistic.

Mr. Drake was glad to be able to report that the new headquarters at Africa House, Kingsway, had given satisfaction, and he paid tribute to the director, Mr. Penwill, and the staff.

The president also congratulated Mr. H. T. Young on the valuable work which he had done in the capacity of president of the I.E.E. during the past year.

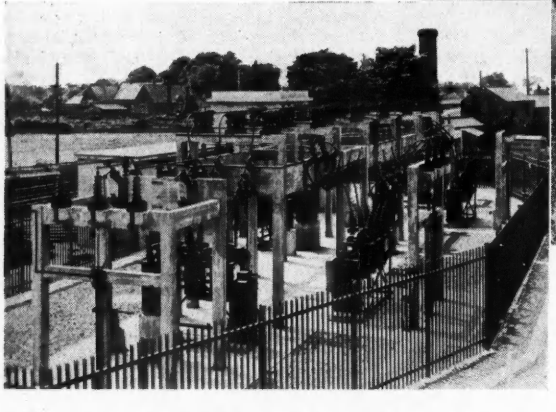
[All the photographs reproduced in the foregoing report were taken by our staff photographer.]

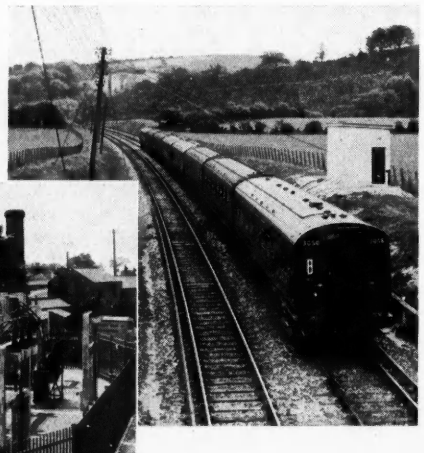
Southern Electric Extends to Portsmouth

YESTERDAY saw the official inauguration of the Southern Railway's newly electrified lines from Hampton Court Junction to Portsmouth and from Woking to Alton. Comprising seventy-seven route miles, this scheme has taken about twenty months to complete and has cost almost £2,500,000. Nearly half an hour is saved on the journey between London and Portsmouth largely due to the better performance of the electric trains on the gradients (up to 1 in 80) between Guildford and Havant.

Under the revised time-table electric train mileage of 4,188,168 a year is replacing 2,235,464 steam train miles. One fast train an hour is to run between Waterloo and Portsmouth Harbour in each direction, calling at Guildford, Haslemere, Fratton and Portsmouth Town. Two stopping trains an hour in each direction will run non-stop between Waterloo and Surbiton and then call at all stations to Portsmouth; these trains will be made up in two sections, one being detached or attached at Woking to serve all stations on the Aldershot-Farnham-Alton line.

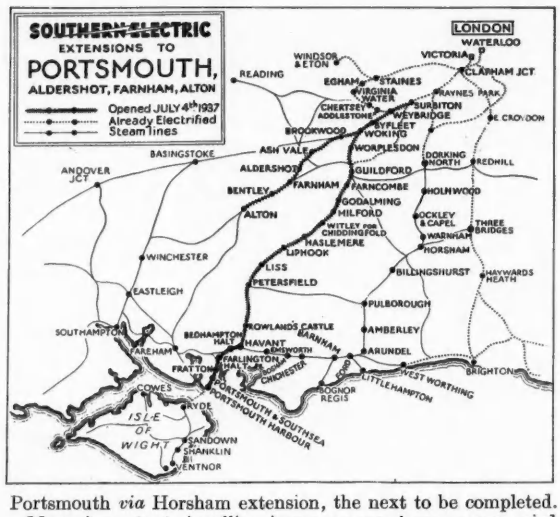
To operate the new services 11-kV supplies are taken from the grid sub-stations at Byfleet and Wymering, and in addition the railway's own generating station at Durnsford Road, Wimbledon, has been enlarged. The sub-station and control equipment employed is of almost identical design to that on previous extensions. Mercury arc rectifiers convert the grid supply to 660 V d.c. at twenty-six unattended sub-stations, which together with eighteen track-paralleling huts are remotely controlled from two control rooms situated at Woking and Havant. The sub-stations each consist of an extra-high-voltage switchgear outdoor section and a rectifier and low-voltage switchgear building. The extra-high-voltage switchgear normally comprises three 500,000-kVA oil circuit-breakers while the rectifiers are rated at 2,500 kW.





Outdoor switchgear at the Havant sub-station and one of the new trains with end-to-end communication

At the Woking and Havant control rooms switchboards are arranged along the walls on which are diagrams representing the whole of the main power circuits supplying the conductor rails. Each panel represents a sub-station, track-paralleling hut or grid sub-station. Woking control room will eventually serve also the Reading extension and Havant the Dorking to Portsmouth *via* Horsham extension, the next to be completed.



Many important signalling improvements have accompanied the electrification, and colour-light signalling has been adopted extensively. Better lighting has also been provided at several of the stations, certain safety devices enabling the 660-V traction current to be employed.

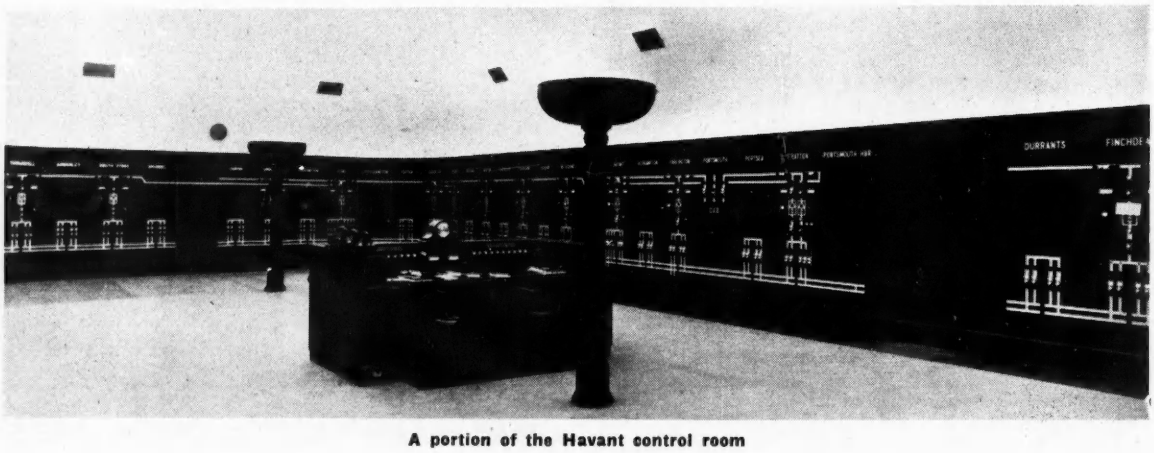
Over three hundred new or rebuilt coaches are available for the new services, a feature being that vestibuled connections are provided at both ends of all four-car trains so that whatever the formation there is end-to-end communication.

The equipment of the all-electric kitchens has a total load of 42 kW and comprises a cooking range with four boiling plates and two grills; four roasting and one steaming ovens; a carving well with a hot cupboard for plates below; a boiler; a coffee percolator; milk, soup and egg boilers; a refrigerator and a wine cooler.

The electricity for the boiling ovens and hot cupboards comes from the 600-V traction supply, while the remaining apparatus is operated from the low-voltage side of a 600/220-V dynamotor. The restaurant cars are air-conditioned.

The following are the principle electrical contractors:—

Asea Electric, Ltd.; British Insulated Cables, Ltd.; British Thomson-Houston Co., Ltd.; British Vacuum Cleaner & Engineering Co., Ltd.; Bruce Peebles & Co., Ltd.; Chloride Elecl. Storage Co., Ltd.; Docker Bros., Ltd.; Edmundson's Electricity Corpn., Ltd.; Elliott Bros., Ltd.; English Electric Co., Ltd.; Estler Bros., Ltd.; General Electric Co., Ltd.; W. T. Glover & Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Johnson & Phillips, Ltd.; Parmiter, Hope & Sugden, Ltd.; Pirelli-General Cable Works, Ltd.; Siemens Electric Lamps & Supplies, Ltd.; Simplex Electric Co., Ltd.; W. M. Still & Co., Ltd.; J. Stone & Co., Ltd.; Taylor, Tunnicliffe & Co., Ltd.; Veronese, Ltd.; and Westinghouse Brake & Signal Co., Ltd.



A portion of the Havant control room

Electrical Progress in Palestine. By L. Katin

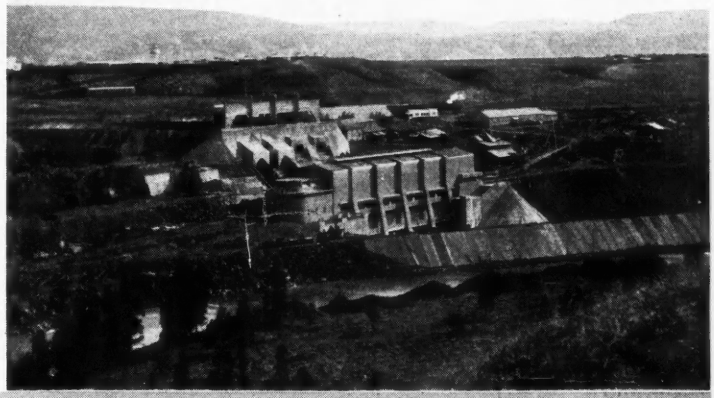
Immigrants insist on modern methods

ALTHOUGH the recurring unrest in Palestine has turned public attention to the country, comparatively few people realise the extent of the change that has taken place there in recent years. Palestine is no longer a primitive land, but a country of modern factories and efficiently planned towns.

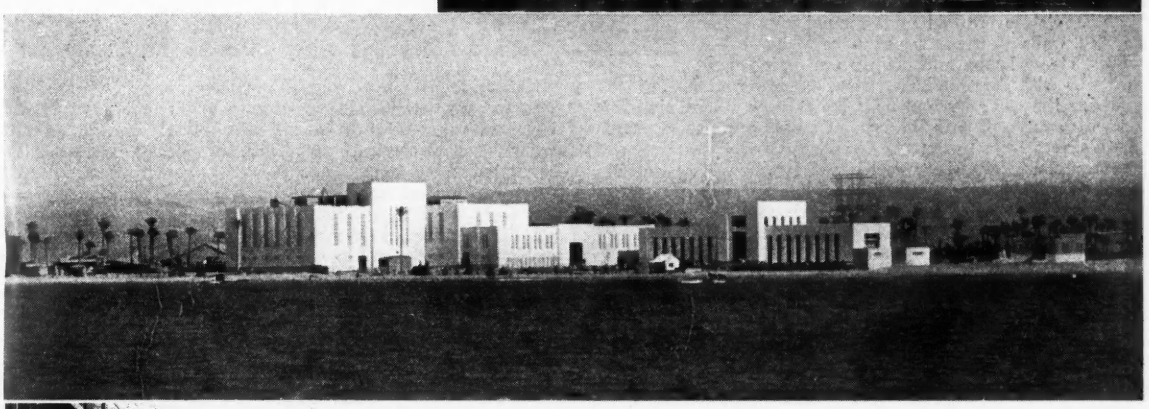
Electricity has played a large part in this transformation. Ten years ago public supplies of electricity amounted to 2,344,000 kWh. By 1930 sales had risen to 6,168,000 kWh; in 1934 the amount was 34,386,000 kWh; in 1935 50,362,000 kWh; and last year 70,018,000 kWh, an increase of 30.5 per cent. over the 1935 total. Of the 1936 total the Palestine Electric Corporation, Ltd., sold 65,496,000 kWh and the Jerusalem Electric and Public Service Corporation, Ltd., sold 4,522,000 kWh, these being the only public supply undertakings operating in Palestine.

Mr. Pinhas Rutenberg, managing director of the Palestine Electric Corporation, may claim to be the father of Palestine electrification, for it was he who formulated the scheme for the hydro-electric plant on the banks of the Jordan and enlisted the support of financiers like the late Lord Melchett and Baron Edmond de Rothschild. His aim was to store the country's winter rainfall in giant reservoirs; the total rainfall extends over four months of the year and approximates to 650 mm. While the necessary work was in progress temporary power stations were set up at Jaffa and Haifa, where Diesel engines generated supplies at 6,300 V.

Lake Tiberias was the basis of the permanent project. It is a natural reservoir, with a surface of 170 million square metres, but the position of the town of Tiberias precluded the possibility of raising the lake level. The adopted alternative was to excavate the bed of the Jordan, whose waters form the lake. About seven miles south of the lake a power house was erected, and to hold the 50-metre fall between this and the lake the Dagania dam was built across the river. East of this another dam was added at the Yarmuk River, a tributary of the Jordan. The upshot of these considerable feats of engineering was a pair of canal-connected reservoirs with a total surface area of 2,000,000 sq. metres.



The Jordan power house of the Palestine Electric Corporation, Ltd.



The Haifa power house and offices of the Palestine Electric Corporation, Ltd.

The Jordan power house accommodates four vertical turbo-alternators of 8,500 h.p., each generating three-phase 50-cycle energy at 6,300 V, which is transformed to 66 kV and transmitted to the Mediterranean city of Haifa, thence by a double-high-voltage transmission line to outdoor transformer stations at Tel Aviv, also a coast city.

A street in Palestine's most electrified town, Tel Aviv

These transformers step down the supply to 22 kV for transmission throughout the north and south of Palestine.

In the urban areas the 22-kV supply is further stepped down to 6.300 V and conveyed to the transformer stations by underground cables. The low-voltage distribution system is 380 V between phases for power and 220 V between phase and neutral for lighting.

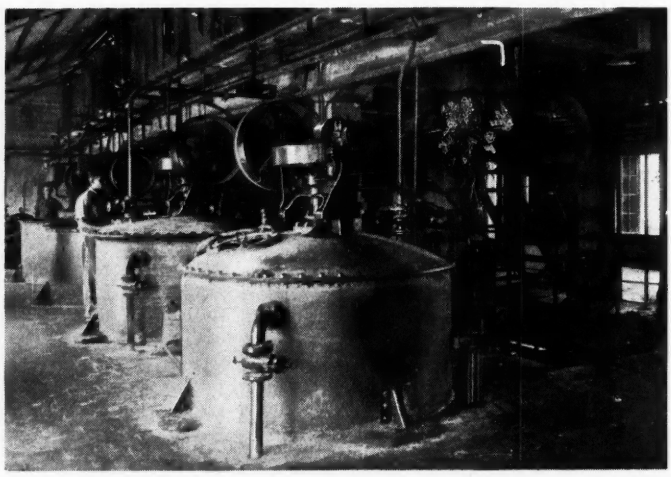
The 22-kV system extends from Haifa and Nazareth to the east through the Esdraelon Valley to the south along the seashore, where it meets the 22-kV system of the Jaffa district, covering the intensely developed orange plantation belt and, in fact, the whole coastal area.

A new steam turbine power house at Haifa was completed in 1935 with a capacity of 18,000 kW, provision being made for further extensions. An additional 12,000-kW set, with corresponding equipment, has been installed, and a further extension is being put in hand. In addition, work has begun on the erection in Southern Palestine of the Reading power house with a capacity of 24,000 kW. Progress, too, has been made with the construction of a new 66-kV transmission line from the Jordan power house to Tel Aviv.

It will be realised that immense difficulties, technical, financial and political, had to be overcome before an

electrification scheme so comprehensive could be operated throughout the country. Backward and poverty stricken as its new guardians found it after taking over from the Turkish régime, Palestine suffered from a natural hesitation on the part of capitalists to invest their money in an intangible future. These hesitations were quickly overcome, however, and Jewish workers were brought in from depressed areas in Eastern Europe to excavate the river bed and to build the dams. Every three or four years the pace of electrification is checked temporarily by inter-racial conflicts, but it soon forges ahead with increased acceleration, as the figures quoted convincingly prove.

The capital, hitherto dimly lighted by candles and paraffin lamps, has been provided with electric illumination of its thoroughfares. It was the Old City (as distinct from the New City) in which the cables were first laid. A sum of £5,000 has been set aside for further improvements in street lighting by means of electricity. Houses are still illuminated by candles and paraffin lamps, but the shops use electricity, and on two occasions during the year the Mosque of Omar is electrically floodlighted.



A modern oil refinery with electric drive at Haifa

The convents mostly have their own generating plants, but they are finding it more convenient to draw their power from the public supply. No jarring note is introduced by the new way of lighting. Cables are laid underground within the Old City, walls are made use of to carry the mains, and the street lamps and fittings are designed to harmonise with the buildings. Even the power station, which is outside the Old City and near the railway station, is constructed to conform with the type of building in the vicinity.

Immigrants from Germany, Africa and England are accustomed to using electricity and want it when they are in Palestine. The biggest domestic consumers are in such new Jewish suburbs of Jerusalem as Rehavia. Incoming Jewish manufacturers insist on electric power for their works, unlike the native people, who prefer to employ manual labour for even the most tedious and difficult tasks.

Little electricity is used in Arab villages and suburbs of Jerusalem, but Ramalleh and Bethlehem, a few miles distant north and south, respectively, are now both wired and use a good deal of electrical energy. The Jerusalem company has powers of supply over a radius of 20 km. from the Church of the Holy Sepulchre. From the power station a three-phase, 50-cycle supply at 6,600 V is taken to various sub-stations, where it is stepped down to the standard distribution voltage of 380/220.

Fifty miles of mains have been laid in Jerusalem and district, and the consumption figures, when the poverty and primitiveness of a large section of the population are taken into account, provide a striking indication of the progressive element which is dominating Jerusalem's social and business life.

Particular factors operate to maintain the remarkable national increase in electrical consumption. Newly established industries include the Dead Sea potash works, cement factories, oil-extraction plants, extensive metal foundries, large-scale newspaper printing works, and factories for the manufacture of almost everything seen in a modern household. It is not only mechanical industries that use electrical power Extensive water-boring is done by electrically operated machinery, as also are artificial-rain manipulation, dairy-work, and the illumination of farmsteads, villages and co-operative settlements. Tel Aviv is the biggest consumer of electricity in Palestine. Large electrically lighted candelabra on the roofs of the synagogue and water towers strike a modern note among the ancient buildings.

A country in the making, Palestine is an outstanding example of development made possible by electricity. Whatever happens to the country in the next few years, the industrialisation process has come to stay.

After the Examination. By "Lecturer"

APRIL and May, for many thousands of young engineers, are examination months; the time when their winter's work is tested and assessed. It is a small proportion only who have to wait until July for their University finals. For most the months from May to September are usually months of reaction. After the strain of the winter there is a strong tendency, easily understandable, for the student to avoid any reference to textbook or notebook until September once again spells compulsion and forces him to pick up the threads.

Clearly, this procedure is somewhat wasteful of effort. The summer break is essential and valuable, but it is a great pity to let the pendulum of reaction swing too far and refuse to look at a book or problem. During these three or four months some extremely valuable consolidation work can be done.

There is one aspect of engineering training constantly present to most students; many sections of the educational course, practically compulsory in spite of certain alternative choices, appear to be of little practical value to his particular conditions. Not infrequently does he leave the lecture room with the feeling "Surely this stuff can never be of any use to me." One answer is to examine a little more closely those sections of his studies which arouse this feeling, particularly from the point of view of their relationship with workshop and drawing board.

For example, wherever the student may be working, in machine shop, foundry, erection shop, drawing office, there are always plenty of examples of applied problems for his examination. His lathe presents problems of torque, speed and horse-power, as do the machines of his mates. The materials with which he works and the tools he uses again provide fields for investigation. They may or may not correspond with the theory of the classroom, but the question is worth probing into in any case. The general layout of the shop, the method of power distribution, the type of motor used for various purposes, and practical developments of a similar character can be examined and checked against theory.

It is often possible, by selecting a suitable time, to get a few minutes' talk with foreman or draughtsman or designer and to find out why particular solutions have been adopted. Most senior men are very willing to give a little assistance to younger men who are keen to make the most of their chances. There are often important influences dictating the acceptance of some particular solution to a problem which have only a remote connection with engineering theory. For example, it may be found that the type of motor used to drive a machine tool does not coincide with the general scheme of motor applications worked out by the lecturer. The explanation is not an error on the part of the teacher, but the existence in the works stores of an old motor which is made to do the job in order to avoid the purchase of a new one.

The summer months, too, are useful for checking and obeying all those exhortations of the tutor which had to be largely ignored with the pressure of examinations looming closely ahead. Most lecturers and teachers worth their place throw out all sorts of helpful suggestions during the course of a winter's work, valuable hints born of many years' experience of the engineering world and its ways. The student notes these, and does the best he can, but it is during these summer months that he really has the opportunity to follow them out more closely and test their worth. There are examination tips which can be checked against very recent experience; sections of textbooks that still await really close study; marked sections of notebooks which await elucidation, and in some cases further explanation.

In a number of ways it is a mistake to down tools completely. The real strain has been removed by the passing of the date of the examination, and the break can be enjoyed to the full without necessarily avoiding all contact with books. The student who does some quiet revision and consolidation is preparing for a flying start when September comes round.

The Regulation of Alternators. By A. W. Hirst

Estimation from test results

THE estimation of the regulation of an alternator from tests requiring little expenditure of power is of importance, not only to the designer in checking design figures when direct measurement on a load test is impossible, but also to the student in that the various methods employed require a knowledge of the general principles underlying the operation of the machine.

The magnetic effect of the currents flowing in the armature winding can be divided into two portions. That which acts upon paths lying in the main magnetic circuit of the machine and crossing the air gap modifies the value and distribution of the main field flux is called armature reaction. The remainder sets up local leakage fluxes surrounding the armature coils which endow the winding with self inductance and produces what is called the armature leakage reactance. Both these effects help to produce a change in the terminal p.d. as the load changes.

[*Elliott & Fry.*

Mr. A. W. Hirst, M.Sc., A.M.I.E.E., is chief lecturer in electrical engineering at the College of Technology, Leicester

Since the current is usually lagging, the normal effect of armature reaction is a demagnetising one which reduces the main flux and, therefore, the generated e.m.f. At the same time, the armature resistance and leakage reactance produce an opposing impedance e.m.f. (often referred to as the impedance drop) which causes the terminal p.d. to be less than the e.m.f.

The maximum value of the rotating ampere-turn wave coincides with the centre line of the coils of any particular phase at the instant when the current in that particular phase reaches the maximum value, *i.e.*, the effect of the armature ampere turns on any particular phase reaches its maximum value simultaneously with the current in that phase. Hence, in a vector diagram (in which only one phase is considered) the armature ampere turns, although due to the *combined* action of all the phases, can be represented by a vector in phase with the current in the phase considered. Further, the leakage flux surrounding the coils of any phase is in phase with the current in that phase, so that both these effects (armature reaction and armature reactance) are proportional to and in phase with the current in the phase considered. It is natural, therefore, that attempts should have been made to simplify the calculation of regulation by combining and treating them together; and these have resulted in methods known as the synchronous-impedance and ampere-turn methods.

Synchronous-impedance Method

In the synchronous-impedance method the effect of armature reaction is treated as if it were produced by additional reactance, and the total reactance, which is naturally much larger than the true reactance, is called the synchronous reactance.

The problem then becomes that of finding the relation between the e.m.f. and the p.d. in a circuit containing resistance and reactance only, the combined effect of which is called the synchronous impedance, and the vector diagram reduces to the simple form (fig. 1) used in the case of the transformer or short transmission line, from which

$E = V + RI\cos\phi + XI\sin\phi$* where X = synchronous reactance.

The value of the synchronous impedance is obtained from the open-circuit and short-circuit curves of the machine. Since armature reaction is treated as additional reactance, the field current on short-circuit is looked upon as being used entirely to produce the e.m.f. necessary to overcome the synchronous impedance of the winding. Hence, for any given field current the armature current I_{sc} obtained from the short-circuit curve is assumed to be circulated by an e.m.f. E_{oc} having a value corresponding with the same field current on the open-circuit curve.

Hence, at any given field current:

$$Z_{syn} = E_{oc}/I_{sc} \text{ and } X_{syn} = \sqrt{Z^2_{syn} - R^2}.$$

Owing to the bending over of the open-circuit curve as saturation is approached, the synchronous impedance is not constant, but decreases as the field current increases. One of the drawbacks of the method is the uncertainty as to which value of the synchronous impedance to use. Further, since the short-circuit test is carried out at low flux densities, the effect of the armature reaction is considerably greater than under load conditions when the magnetic circuit is partially saturated. Thus the method, although exceedingly simple, gives values of regulation which are usually considerably higher than those obtained under actual load conditions.

* This expression is very nearly true if the angle α is small; the correct form is $E = \sqrt{(V_{cos\phi} + RI)^2 + (V_{sin\phi} + XI)^2}$.

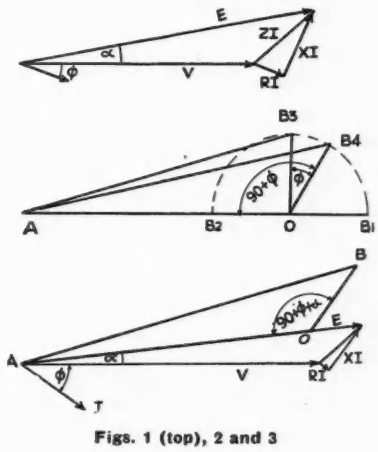
Ampere-turn Method

In the ampere-turn method also, armature reaction and reactance are treated together, but here the effect of reactance is considered as due to additional reaction. It is assumed that under any load conditions the field ampere turns are utilised in (a) producing the required e.m.f. and (b) overcoming the demagnetising effect of the armature reaction. The effect of the resistance of the armature winding is, for the moment, omitted, but it is small and can often be neglected.

At zero power factor lagging the armature ampere turns directly oppose the main field ampere turns, so that, as in fig. 2, the total excitation (AB_1) required to produce a given e.m.f. under these conditions is the sum of the ampere turns (AO) required to produce the e.m.f. as obtained from the open circuit curve and the ampere turns (OB_1) required to neutralise the armature ampere turns. Similarly, at zero power factor leading, which does not often occur in practice, the armature ampere turns are directly magnetising and the excitation to be supplied by the field coils (AB_2) is less than the excitation (AO) required to produce the e.m.f. by the amount of the armature ampere turns (OB_2). It is clear that between zero power factor lagging and zero power factor leading the vector OB turns through 180 deg., so that at unity power factor its position is at OB_3, and the total excitation to be supplied by the field coils is AB_3; while at any lagging power factor, cos ϕ, the armature ampere turns are represented by OB_4 inclined to AO at an angle $90+\phi$, and the total ampere turns to be supplied by the field coils, by AB_4.

The number of turns on the field coils is often unknown, so that it is usual to work in terms of the field current to which the field ampere turns are proportional.

The field current equivalent of the armature ampere turns is obtained from the short-circuit curve. Under short-circuit conditions, if the armature resistance is neglected it is assumed that the whole of the field current necessary to circulate a given armature current is utilised in overcoming the demagnetising ampere turns produced by that current. Also, since the resistance is very small, the current lags by a large angle so that the field current is a measure of the demagnetising effect of the armature ampere turns at zero power factor lagging, and can be represented by the vector OB in fig. 2.



Figs. 1 (top), 2 and 3

The following construction results therefore:—AO is set off horizontally to represent the field current necessary to produce the normal terminal voltage, obtained from the open-circuit curve. At an angle $(90+\phi)$ OB, is drawn representing the field current required to circulate full-load current on short-circuit, obtained from the short-circuit curve. Then AB_4 represents the total field current required when full-load current is being supplied at normal voltage and at a power factor cos ϕ.

If the resistance of the winding is to be taken into account it is generally sufficiently accurate to consider the generated e.m.f. to be equal to the terminal p.d. increased by RI cos ϕ, the component of the resistance drop in phase with it.

This method also gives approximate results only, the value of regulation obtained being too small; so that the regulation obtained by direct measurement usually lies somewhere between the values given by the two methods.

Wattless Current or Zero P.F. Method

In the wattless current or zero power-factor method the effects of armature reaction and armature reactance are

separated, and although not as simple as either of the others, it is capable of giving more accurate results. It requires a knowledge of the normal open-circuit magnetisation curve and, in addition, a full load magnetisation curve at or near zero power factor lagging, *i.e.*, a curve relating terminal p.d. and field current when full load current at or near zero power factor is flowing. This curve is not easy to obtain unless the alternator can be loaded on to an under-excited synchronous motor, but if such facilities are not available, it is possible to carry out the construction with a knowledge of only two points on the curve, one of which may be at short-circuit. This leaves only one other point to be determined, and this may be obtained by the use of reactors such as are often used for carrying out a zero power-factor heat run.

The two curves are shown in fig. 4. Suppose that PR represents on the voltage scale of the diagram the true leakage reactance (not synchronous reactance) drop per phase at full load current. At short-circuit the field current OQ can be divided itno two portions: One portion, OR, is that required to produce the e.m.f. to overcome the leakage reactance (resistance is again neglected as its effects at low power factor is very small); the other portion RQ is that utilised in overcoming the demagnetising ampere turns of the true armature reaction.

Now consider a point M on the open-circuit curve. To produce the same e.m.f. at full-load current zero power factor requires an additional field current MS to overcome the armature reaction, the total field current being ON_1. But the terminal p.d. at this field current is N_1N. Hence, since at zero power factor the resistance drop is negligible and the reactance drop is almost directly subtractable from the e.m.f. SN(=MH) must represent the reactance drop. Further, for a constant load current and a constant power factor the effect of both armature reaction and reactance are constant. Therefore, MH=PR and HN=RQ so that the zero power factor curve is the open circuit curve displaced by a distance MN.

Up to the present it has been assumed that the points P and M are known, but in practice the position of M corresponding with any point N must be obtained. One method of doing this follows from the statement above. A tracing of the zero power-factor curve, on which is marked at a convenient position the point N, is displaced, keeping the axis OX horizontal, until it coincides with the open circuit curve; the point M on the open circuit curve is that which then lies under the point N on the tracing.

The following, however, is a simpler method. If it is imagined that a tracing of the open circuit curve and of the triangle PQR is placed so that Q falls on N and QR along NH, then the point M is given by the intersection of the tracing and the original curve. In practice, since the portion OP of the open-circuit curve is almost a straight line, it is unnecessary to make the tracing, and the following construction results:—

The open-circuit and zero power-factor curves are plotted in terms of phase voltage. From any convenient point N above the knee of the zero power-factor curve, NL is drawn equal and parallel to QO, and through L is drawn LM parallel to the open-circuit curve at the origin (*i.e.*, to OP) cutting this curve in M. From M, MH is drawn perpendicular to NL. Then MH is the reactance drop per phase and the leakage reactances per phase $=\frac{MH}{I}$ ohms, where I is the full load phase current, while HN is the field current neutralised by armature reaction at zero power factor. Two points only on the zero power-factor cure, *i.e.*, Q and N, are needed for the construction. Having obtained these quantities, the generated e.m.f. and field current and hence the regulation can be found for any load condition. The full load e.m.f. can be calculated or obtained graphically by the method of fig. 1, using the leakage reactance instead of the synchronous reactance. The total field current is then obtained by the vectorial addition of the field current required to produce the e.m.f. and the field current neutralised by armature reaction, as in the ampere-turn method, except that the latter component does not include the effect of reactance.

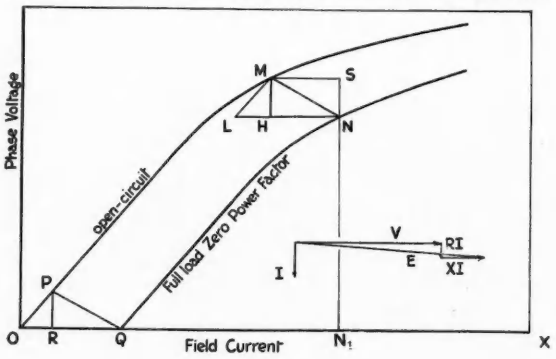


Fig. 4

The effect of armature reaction depends upon the angle between the current and the e.m.f., *i.e.* ($\phi+\alpha$) but in the ampere-turn method, which gives only approximate results in any case, it is often sufficient to take this angle as being that between current and p.d. as was done in fig. 2. In the more accurate zero power-factor method, however, it is worth while taking this into account as in fig. 3.

The field current AO, to produce the e.m.f. is set off along the e.m.f. vector, while the field current, to neutralise armature reaction OB is drawn perpendicular to the current vector, *i.e.*, at an angle ($90+\phi+\alpha$) to AO. Then AB is the total field current.

The National Library of Wales is to be opened on July 15th by Their Majesties the King and Queen. The illustrations show the Council Chamber lighted with unpretentious spherical fittings and the floodlighted exterior **(See note on page 21)**

An Unpleasant Business

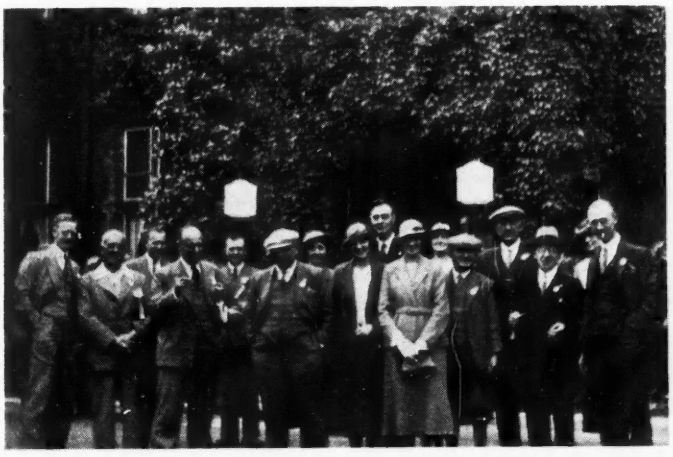
A motor that Messrs. McClure & Whitfield were called upon to repair recently furnishes a good example of the adverse conditions under which electrical apparatus is expected to, and does, operate for long periods without trouble until at last breakdown point is reached. This motor, a 1 h.p. d.c. machine, was installed in a fish house, where it ran 10½ hr. per day continuously for many years (60 hr. per week) without stopping, except during week-ends, until a few days ago, when it refused duty. The ultimate cause of failure was due apparently to the activities of a family of rats, which were being brought up in a nest inside the motor frame and had suffered electrocution. For feeding the four young rats a considerable quantity of food had been stored inside the motor, which indicated that the domestic amenities were not disturbed by the fact that the armature made 1,000 r.p.m. That was not the worst, however, as practically the whole space underneath the armature was filled with decomposed smoked fillets and other bits of fish, and the fate of the rats, unfortunately, had not been shared by the maggots, which made the repair work singularly unpleasing.

The Mining Electrical Convention

Works visits and social events

FINE weather favoured the annual convention of the Association of Mining Electrical Engineers at Southport last week. Bookings for the several events exceeded expectations and the programme had wisely been so arranged as to avoid alternative counter-attractions to the works visits which afforded excellent opportunities of inspecting control gear and cables of typical specialised designs expressly manufactured for mining duties.

On the first morning a party of 250 proceeded by special train from Southport direct to the Trafford Park works of the Metropolitan-Vickers Electrical Co., Ltd., additions to several



[*Elec. Rev. photo.*

Some of the delegates outside the Blundellsands Hotel after the visit to the Liverpool Electric Cable Co.'s works

sections of which were observed to be nearing completion. Apart from a tour of the principal departments, all exceptionally busy, a special attraction had been prepared in the form of a self-contained exhibition of unusual instructional value. It was planned to display the entire electrical equipment of a colliery, from the surface sub-station to the shaft bottom, thence to the pumps, haulage roads and coal face.

The main exhibits were a large-scale illustration of a typical layout of a working model of a skip winder, showing the operation of control gear with automatic features and safety devices, a working demonstration of a Lilly overwind protection controller with the new M-V hydraulic slow banker unit, a working demonstration of an M-V gate-end box, and a wide range of other equipment.

Luncheon and tea were served in the works canteen, and Mr. H. C. Pierson (director), who presided, presented an electric fire, an iron, a "Traffolyte" tray and a table lamp as prizes to ladies for guessing the weight of a flywheel.

The visitors returned to Southport by the special train chartered by the M.-V. Co. in time for a civic reception in the evening by the Mayor and Corporation at the Floral Hall in the promenade gardens, followed by a cabaret and dancing. The Mayor of Southport, Councillor H. W. Barber, is well known as the branch manager for Johnson & Phillips, Ltd., in the Manchester area. An unexpected contribution to the evening's entertainment was a demonstration of a Hammond electric organ.

The whole of the second day was devoted to a motor coach excursion to Chester, *via* the Mersey Tunnel, Hoylake and Heswell, the return drive being by way of Eastham, Port Sunlight and Liverpool. Between luncheon and tea a few of the tourists found time to examine the water turbines in the Chester Corporation's small hydro-electric works situated on the River Dee.

A somewhat lively general council meeting took place upon the last morning, 130 other members and ladies meanwhile travelling by road to visit the works of the Liverpool Electric Cable Co., Ltd., in which both rubber-covered and paper-insulated cables are manufactured. Copper wire is obtained from the associated mills at Manchester of the London Electric Wire Co. & Smiths, Ltd. A feature of the rubber-covering section is an electrolytic method of cleaning the copper wire prior to tinning in electrically heated and thermostatically controlled baths.

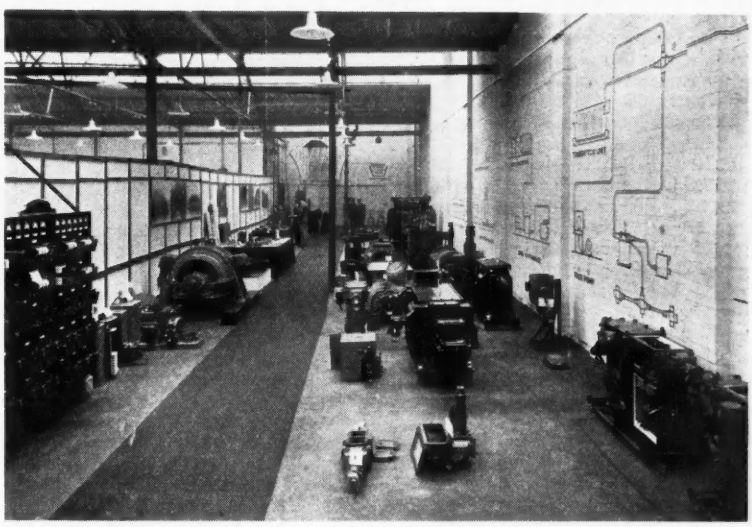
This company specialises in metal-screened and other types of trailing cables for use underground in mines. Beside deaerating and mass-impregnating plant there is special equipment for pre-impregnating the paper insulation of non-bleeding mine shaft cables, and an additional electrically heated lead press for cable sheathing has recently been installed. The company has developed compact spark testing apparatus which it expects to put into use in the very near future. The company provided transport and luncheon at Blundellsands, Mr. W. J. Terry (managing director) presiding.

At the annual general meeting, held during the afternoon of the last day, Mr. J. R. Cowie (retiring president) took the chair, and he indicated that all branches were doing well and the membership was increasing; a special campaign among the younger prospects was now beginning to show results.

Mr. J. A. B. Horsley, H.M. Electrical Inspector of Mines, was elected president, and new vice-presidents are Mr. H. A. McGuffie (Glasgow, where next year's Convention will take place) and Mr. T. H. Williams.

A reception by the president in the evening preceded the Association's annual dinner. Sir Alfred Faulkner (Mines Department) proposed "The A.M.E.E.," and Mr. J. A. B. Horsley responded. "The Mayor and Borough of Southport" was proposed by Mr. G. E. Gittings (past-president, N.W. Branch), and Coun. H. W. Barber replied. "The Mining Industry" was proposed by Mr. A. B. Muirhead and acknowledged by Sir Robert Burrows. On behalf of the guests, proposed by Mr. H. E. Heyes (president, N.W. Branch), Mr. H. C. Pierson and Mr. W. J. Terry replied. Before the dance the president presented a cup given by Mr. W. A. Heyes and a number of golf prizes.

Nearly 350 people attended the Convention, which was admirably organised by the North-Western Branch (Messrs. Heyes, Wigan). Independently, exhibits on view for the occasion in Southport were arranged by Lancashire Dynamo & Crypto, Ltd., motors and overhead gear; Johnson & Phillips, Ltd., cables and joint boxes; and the Automatic Electric Co., Ltd., underground mine signalling equipment.



A special exhibition of mining electrical equipment arranged by the Metropolitan-Vickers Co. at its Trafford Park works

Presidential Address

Mishaps due to the use of electricity are a very small fraction of the total number of accidents resulting from the inherent hazards and existing practice of coal mining in this country. This fact was forcibly emphasised by Mr. J. A. B. Horsley, H.M. Electrical Inspector of Mines, in his presidential address.

From 1927 to 1936 inclusive below ground in all mines in Great Britain where coal, fireclay or oil-shale was worked,

8,656 persons were killed. To this total electricity contributed 224 in all by shock, fire and explosion, or 2.59 per cent., including 33 persons killed in two explosions due to unsafe signalling bells and 58 persons killed in the explosion in 1936 at Wharncliffe Woodmoor Colliery (which has been ascribed to electricity as the most likely cause). From 1925 to 1935 (excluding 1936, when many collieries were idle for more than six months) the total number of persons incapacitated for more than three days was 139,150. Of this total only 38, or 0.027 per cent., were electrical, due to shock, fire and explosions.

Mr. Horsley's analysis showed that the commonest risk is that of electric shock. Thus from 1915 to 1936, both above and below ground, there were 220 fatal electrical accidents. Of these 179, or 81.4 per cent., were instances of electric shock or arc burns; 31, or 14.1 per cent., were ignitions of firedamp, including two instances of ignition by unsafe signalling bell circuits; the remainder, totalling 10, or 4.5 per cent., were distributed in nearly equal proportions under the three headings of fire, burst switchgear and other mechanical injuries.

The analysis of the same accidents with respect to the description of the apparatus involved is useful because it directs attention to the more dangerous components of a colliery electrical installation, on the basis of ascertained facts. It may be summarised thus: Out of 220 accidents, 73, or 33.2 per cent., were associated with flexible cables or plugs; 60, or 27.3 per cent., related to separate switchgear and fuses; 29, or 13.2 per cent., related to overhead lines; of the remainder under the heading miscellaneous, 15, or 6.8 per cent., related to coalcutting machines with their integral switches, and sundries 43, or 19.5 per cent. of the total. In descending order of numbers these 43 accidents included lighting circuit accessories (12); unarmoured cables (11); motors, generators and transformers (9); armoured cables (8); unspecified (3).

"Southport Visiter"

A part of the company at the civic reception and dance

Non-fatal Electrical Accidents

During the decade ending with 1936 there were 535 non-fatal accidents and reportable dangerous occurrences due to the use of electricity in comparison with 107 fatal accidents. Shock or arc burns accounted for 84.7 per cent. and ignitions of firedamp for 3.36 per cent., while fire underground and other causes together accounted for 11.94 per cent. of the total number.

With regard to the apparatus involved, switchgear and fuses accounted for 43.7 per cent.; flexible cables and plugs, 40 per cent.; overhead lines, 3 per cent.; the remainder, amounting to 13.3 per cent., included armoured cables, which accounted for nearly half the number.

The greater proportion of ignitions of firedamp at the coal face is preventable, either by better design or by more effective supervision, especially the latter. The earthed metallic screen, which is a common feature of flexible cable design to-day and is intended as a safeguard against electric shock, which is the common risk in the use of electrical power, may augment the risk of open sparking unless the cable is adequately cared for. The number of ignitions due to electricity in relation to the quantity of mineral cut by electrically driven coal-cutting machines in comparison with ignitions from other causes needs no comment.

Flexible cables have been responsible for nine ignitions of firedamp in the last ten years, not all of which resulted in personal injury, out of the total number of 38 ignitions of firedamp due to the use of electricity. The risk of open sparking with such cables is one for which there is as yet no structural remedy of proved value, but the danger can be reduced by better care in the use of the cable and by systematic testing, which involves periodic removal to the surface of the mine.

While few, if any, electrical accidents can be described as unpreventable, about 18 per cent. of the fatal and about 10 per cent. of the non-fatal electrical accidents have been classified as unforeseeable by the author for the ten years 1927-1936. The factors which contribute to electrical accidents are controllable by human agency; that is to say, either by improvement in material, or in the care devoted to use of the equipment.

From 1927-1936 inclusive approximately 24 per cent. of the fatal accidents and 13 per cent. of the non-fatal accidents associated with the use of electricity were due to defective design and the balance to mishandling. Not the whole of this balance, by any means, can properly be laid solely at the door of the workmen, whether collier or electrician. Lack of effective supervision and control is the real underlying cause of many electrical accidents. Too much is left to the assumed knowledge and skill of electrical subordinates and uninstructed workmen.

Unnecessary Risks

Some 17 per cent. of the fatal accidents are attributable to faults of organisation, coupled with lack of suitable equipment. About 40 per cent. of the fatal electric shock accidents were due to defects whereby metal parts of apparatus, or the armouring of cables, attained a dangerous potential, in spite of the practice of earthing such parts. It is now generally recognised that earthing is not by itself a complete safeguard against electric shock, for to complete the protection so afforded it is necessary to apply means to ensure the immediate automatic isolation of the circuit when an earth fault develops. That involves the employment of leakage protection.

Some 60 per cent. of the fatal electric shock accidents were due to contact with live parts. Such risks are unnecessary and work should not be attempted on live switchgear. Other accidents from direct contact with live conductors occur on overhead lines, either because there is no structural provision in the controlling switchgear to put the lines to earth, or because, in spite of such provision, the organisation for such work is haphazard and too much is left by the individuals responsible to improvisation and to the discretion of the linesmen.

In the last ten years there were three outbreaks of fire originating in cables or apparatus which caused loss of life and 43 other instances which were reported as dangerous occurrences but did not result in any personal injury. A not uncommon feature of these outbreaks has been the repeated reclosing by hand of a circuit-breaker that has been tripped out automatically upon the development of the electrical defect that ultimately resulted in setting the cable on fire.

Fire risk with cables has attracted considerable attention lately, but there is little if any evidence that fire will travel along a horizontal cable of any description, while there is positive evidence, in actual fires in coal mines, to the contrary. Fire risk with cable is to be investigated experimentally by the Cable Makers' Association.

It is not reasonable to expect electrical apparatus to withstand anything that uninstructed men, or the forces of nature, can do to it. It is futile to spend money on elaborate automatic safeguards, unless these are maintained in a condition to meet the emergency for which they were designed. The first necessity for the continued safety of flexible trailing cables is an adequate supply of spare cable ready for immediate substitution.

Where there is organising ability, backed by adequate authority, in those responsible for the electrical installations, not only are accidents few, but interruptions of service are rarely experienced. A modern colliery electrical installation requires to be supervised by a trained and experienced electrical engineer having the confidence of the management and the necessary delegated authority to make his control effective.

Favourable as is the record of electrical accidents in mines, the number could be reduced by co-operative effort between the actual user, the technician who has to keep the installation in working order and the management.

Municipal Transport Conference

Trolley-buses discussed

THE annual conference of the Municipal Tramways and Transport Association was held in Portsmouth from June 23rd to 25th. On the opening day the Association was given a civic welcome by the Lord Mayor, after which the president (Mr. C. Owen Silvers, general manager of the Wolverhampton Corporation Transport Department) delivered his address.

Referring to trolley-buses, the president said that the route-miles now operated in this country numbered 525 and there were about 2,000 vehicles. He thought that any further large expansion must depend largely upon electricity supply authorities realising the importance of cheap electricity. It was astonishing, he said, that many of the larger transport undertakings should be compelled to pay more than 0.5d. per kWh for low-voltage supplies. Where a municipality owned the transport and electricity services electricity should, as a general principle, be charged for at cost price.

Speaking of broadcasting and electrical interference, he said that opponents of trolley-buses had made as much as possible of this. One outstanding point in the findings of the Committee which has been considering this matter was, however, that trolley-buses caused a minor amount of the interference experienced, and all operators were fitting suppression devices on their new equipments. So far as existing apparatus was concerned, in his opinion it would be wrong in principle for operators to bear he cost of modification to meet the needs of a second comer (the B.B.C.).

The claims made by the Post Office for electrolytic damage to Post Office cables have been a subject of controversy for many years, but the president said he was happy to state that during the past year a settlement of outstanding claims had been made which was satisfactory to both sides, and suitable procedure for consultation on further installations of cables was the next step, which an *ad hoc* committee was now considering.

Collector Gear Investigations

The report of the Council was then considered. This detailed work done during the year, and among other things mentioned the formation of the new National Joint Industrial Council for the Road Passenger Transport Industry which now embodies tramways, trolley-buses and motor buses. A considerable amount of investigation was undertaken with regard to overhead equipment and current collector gear. The Joint Committee on Overhead Equipment, as a result of its work during the year, was of the opinion that progress in current collection would probably be in the development of the sliding shoe, but it considered that trolley wheels would continue to be used on provincial trolley-bus systems for some considerable time. Experience with the sliding shoe form of collector on a large scale was at present limited to London where experiments with these were continually proceeding and where hopes were entertained that something would emerge comparable with the carbon brush of electrical machinery. The shoe collector was to be adopted on the trolley-bus system to be operated in Manchester. Two new forms of trolley pole were in experimental use and gave promise of improved performance leading to reduction in de-wirement, and on one system a trolley head had been devised, and was now obtainable from the manufacturers, in which the wheel spindle was carried on spring supports. It was anticipated that the risk of de-wirement would be reduced by the use of this device.

On June 23rd a paper was read by Mr. Frank Pick (vice-president, London Passenger Transport Board) entitled "Towns, Town Planning and Town Transport." This was accompanied by a large number of lantern slides.

The morning session on June 24th was devoted to a paper describing the Portsmouth trolley-bus system, the author being Mr. Ben Hall, city transport manager. He mentioned that one feature of the overhead equipment was the adoption of cross tubular suspension for spans up to 40 ft. in preference to span wire construction. He expressed the view that a modern trolley-bus system could effectively cater for any area served by a tramway and deal with any urban demand.

Room for Improvement

Mr. J. M. Calder (general manager, Reading) said that despite the great developments in trolley-bus operation during the past five years there was still room for much improvement. Much of the equipment was cumbersome and heavy, and while suspension and fittings were sound electrically they were far too heavy mechanically. He contended it is not always the best policy to try to adapt existing tramway equipment for trolley-bus operation, and he mentioned that in Reading he had adopted the tubular form of overhead construction in preference to span suspension, notwithstanding some adverse and humorous criticism of it. With regard to the type of control for the vehicles, namely, augmented rheostatic or regenerative control, Mr. Calder said that the early difficulties with rheostatic control had been overcome, and while there were many advantages with regenerative control as regards braking, &c., there were difficulties in connection with the building up of bus-bar pressure when using mercury-arc sub-stations which must be taken into account. Over-voltage release apparatus on the vehicles had not been so successful as had been anticipated, and he was now putting apparatus in the sub-stations to deal with the auxiliary current which was, so to speak, generated as the result of regenerative control. A point in connection with supply which was not always appreciated was that the amount of current taken by only one vehicle starting on a slight gradient might be as much as 200 to 300 A. For this reason he thought it was better to install a series of small sub-stations in preference to putting in heavy feeders.

Mr. H. A. Muscroft (general manager, Southend-on-Sea) pointed to the possibility of certain dangers to the linemen with the tubular form of construction for overhead equipment. He suggested that the drivers were the deciding factor in the question of regenerative control and therefore it was necessary that they should be thoroughly trained.

Mr. Arthur Baker (general manager, Birmingham) said he held the view expressed by his late father in 1926 that trolley-buses were only suitable for small towns. He spoke of the difficulty of transferring vehicles quickly to meet traffic requirements, and said that from this aspect, and also the aspect of private hire, the motor-bus was more suitable.

Mr. A. A. Jackson (general manager, St. Helens) suggested the desirability of adopting 120 V instead of 60 V for the battery operation of trolley-vehicles when manœuvring, and said that with ordinary control on his vehicles the life of the brake linings was very short indeed. At the same time, although regenerative control showed a great advantage in this respect, there was the possibility of trouble with the transmission and differentials of the vehicles. Realising that the use of the old tramway rails for the return, in the case of trolley-bus operation, might be prohibited by the Minister of Transport in the near future, and visualising a large increase in traffic, he had decided to install a number of mercury-arc rectifier sub-stations, feeding into the line at 600 V. Speaking on the question of guard wires for protection of Post Office wires, he said he found it better to use p.b.j. and do away with the necessity for guard wires.

Co-operation With Manufacturers

The author agreed with Mr. Calder that equipments were too heavy and suggested that managers should co-operate and take this matter up with the manufacturers. He said that there had been no adverse criticism of the tubular construction in Portsmouth, and with regard to over-voltage with regenerative control added that the manufacturers of mercury-arc rectifiers had now got right down to this problem. He had decided to put down two mercury-arc rectifier sub-stations. There had been no trouble either with the transmission or differentials on the Portsmouth vehicles, and regenerative control had been entirely satisfactory. There were one or two points on the Portsmouth system where it was necessary to use guard wires, but the whole of the telephone lines would be underground very shortly. There had been no trouble with guard wires. On the question of de-wirement, he said the rate at present was one in 2,500 miles, but as the men became more experienced that number would be considerably reduced. Finally, he said that although he had tried various forms of current collector he had come back again to the trolley wheel.

The final paper before the conference dealt with traffic congestion, the author being Mr. W. G. Marks, general manager of the Liverpool Transport Department.

The annual dinner of the Association was held at the Portsmouth Guildhall on June 24th. The president was in the chair and there was a company of about 300 members and guests.

I.E.E. Students' Activities

The London Students' Section of the Institution of Electrical Engineers has arranged a visit on July 4th to the Denham studios of London Film Productions, Ltd. (ladies are invited). On July 10th and 17th the annual cricket and tennis contests for the Young trophy will take place on the Faraday House sports ground at West Molesey. From July 31st to August 7th a joint visit of all I.E.E. students' sections to the International Exhibition, Paris, has been arranged.

Correspondence

Contributions from readers are welcomed. The writer should give his name and address, not necessarily for publication

Registration and Inspection

With regard to Mr. Walter Riggs's E.C.A. paper dealt with in this week's issue of the ELECTRICAL REVIEW, I quite agree that registration of electricians and wiremen would be admirable and probably the only sure way of safeguarding the public, but it means a long process to effect this. Why not some immediate action?

The supply authorities have the power to put a stop to "jerry work." If they did their testing and inspecting conscientiously, we could write "finis" to bad material and workmanship by the so-called contractor, and those who, although members of the National Register, unfortunately do "jerry work."

I can bring a case forward where the contractor was on the National Register but flagrantly ignored the specification, and although the test was not in the region of what was required, the supply company connected. The public need safeguarding. The mere fact that a supply company or corporation passes their installation is their guarantee, but what a guarantee! About 25 per cent. of new installations should never be connected. Stop this and the problem is solved.

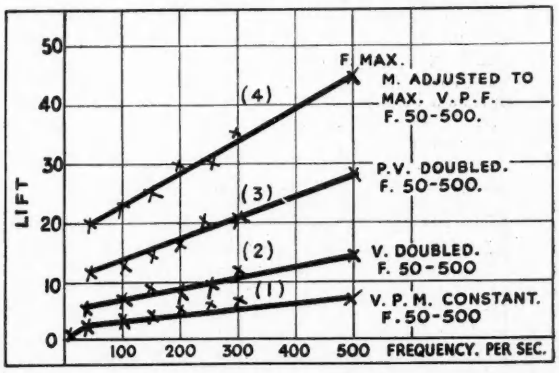
I manage the electrical department of a firm who are members of both the N.R.E.I.C. and E.C.A. and who are anxious to give the public that safety we hear so much about, but it often makes one think that "cut prices" and "jerry work" is the easiest money. T. G. KELLY.

Farnham, *June 28th.*

Electricity and Gravitation

Recent experimental work of mine seems likely to be of considerable interest to electricians, for it has been directed towards finding a connection between electricity and gravitation. In view of recent discoveries at the Carnegie Institute in Washington, U.S.A., I think there is some reason for attaching importance to the results I have so far obtained, though it needed this confirmation of the primary assumptions of my working theory to give me confidence that these results are leading in the right direction.

It was assumed at the beginning of my work that gravity is akin to magnetism, and, like magnetism, for intensive generation required a particular form of electric current to be applied to a particular arrangement of material. This view is, I believe, turning out to be correct: and just as the magnitude of the magnetic field may be varied by varying the essentials, so it is also with gravity. As the various factors concerned are varied, weight decreases proportionately; and since at least three of the factors are susceptible of variation far beyond my laboratory limits, the inference appears to be admissible that the variation of weight may take on economic importance.



Lift is the variation in weight caused by impressing on suitable radiators pulses of high-voltage electricity. The graphs show at a glance the effect of variation of four factors: f, frequency of pulses; v, voltage; p, electrical power applied, m, (form of radiator)

Although the method is still in its infancy, the final result shown in the accompanying graph (4), is over eighty times greater than the first shown in graph (1), and the rules have been worked out for further increase. Nevertheless, it is an extremely difficult problem, and I would like to get into touch with electricians who are interested in the subject.

London, S.W.13, *June 24th.* W. D. VERSCHOYLE.

The L.C.C. and the "White Paper"

THE London County Council received a copy of the Ministry of Transport's memorandum on the reorganisation of electricity distribution and referred it to the Public Control Committee for consideration. This week the Committee presented its report and recommendations. After briefly reviewing the proposals, the Committee states that as regards the London area in no case is it proposed that a company shall be absorbed in a municipal group, whereas at least two municipal undertakings would be absorbed in a company group. Under the London Electricity (Nos. 1 and 2) Acts of 1925 the tenure of the London companies was extended until 1971 when they were to be acquired by the London and Home Counties J.E.A. The Ministry now proposes to rescind the existing rights of local authorities and substitute an equated period of tenure not exceeding fifty years. It would appear that the J.E.A. would cease to exist except as an undertaker supplying electricity in certain areas outside the County of London.

The Committee goes on to say:—

"The reorganisation of a service so essential to the country's needs as that of electricity distribution is, in our opinion, an urgent necessity, but such reorganisation should, we consider, be on bold and comprehensive lines having as its object the provision of the most efficient service at minimum cost. Private interests should not, in our view, be permitted to hinder the formulation of a scheme designed to ensure that the interests of the nation now and in the future shall be fully safeguarded."

It is therefore proposed to communicate to the Ministry of Transport the following views on the matter:—

That the Council, while it would welcome a comprehensive national scheme for the reorganisation of the electricity supply industry in the public interest and regards the enactment of such a scheme as being urgently required, cannot support the proposals so far made by the Minister of Transport in regard to the reorganisation of electricity distribution, and emphasises the following points:—

(i) The scheme would set up or preserve differing and conflicting types of organisations and, by consolidating their tenure, would render a comprehensive scheme more difficult of enactment in the future.

(ii) The whole tendency of the scheme is towards entrenching private profit-making monopolies in an industry which should be conducted as a public service with a view to giving the best possible advantages at a minimum cost to industrial and domestic consumers. The scheme is thus contrary to the interests of consumers and the community as a whole.

(iii) The scheme favours private companies as against municipal undertakings and would involve the acquisition of some municipal undertakings by private companies, and at a later stage, in order to institute a national scheme, it would thus be necessary to pay compensation to the companies in respect of municipal undertakings which the scheme would have transferred to them on favourable terms.

(iv) Under the scheme, a company whose undertaking is acquired by a municipality would be compensated on a much more generous basis than a municipality whose undertaking is acquired by a company.

(v) As regards the Administrative County of London, the scheme would appear to place the distribution of electricity in the hands of about eight bodies, some of them companies and some public authorities, while, as regards Greater London, i.e., approximately the area served by the London and Home Counties Joint Electricity Authority, the scheme would apparently set up about 22 organisations, some companies and some public authorities. Such a division of the industry cannot be regarded as dealing adequately with the problem of the reorganisation of the industry in London.

At Tuesday's meeting of the Council Sir Harold Webbe, leader of the opposition, moved an amendment to the resolution which pointed out the need for modification of the scheme and the protection of consumers while accepting the scheme in principle as facilitating a more comprehensive scheme at a later date. It also urged the need for the exercise of public control over private undertakings in the lines of the 1925 agreements between the Council and the companies.

Mr. Herbert Morrison said that he had rejected a similar scheme when he was Minister of Transport. The whole tendency was to entrench private profit-making monopolies to the maximum extent and to set up a greater number of differing and conflicting organisations.

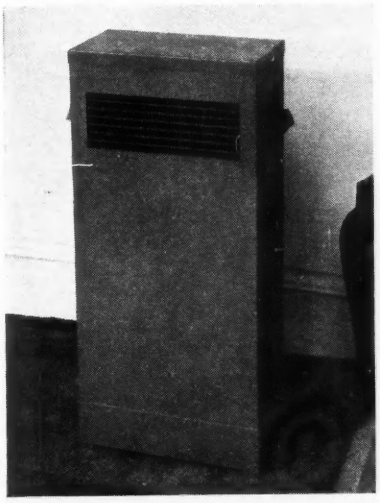
After Sir George Hume had urged a more constructive attitude upon the Council, the amendment was defeated and the Committee's proposals were approved.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

A Convector Heater

A novel arrangement of the elements up and down vertically almost the full height of the case, has been adopted in a new convector made by BRATT COLBRAN, LTD., Lancelot Road Works, Wembley. This results in the casing remaining extremely cool, so avoiding risk of scorching nearby objects. The entry of the flex at the base allows the apparatus to be placed flush against the wall.

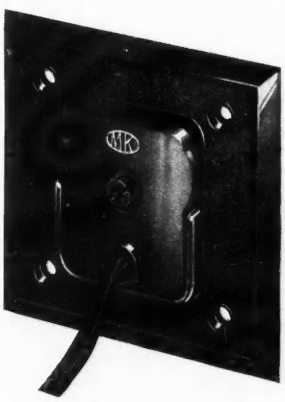


A Bratt Colbran convector heater

The convector is fitted with handles so that it may easily be moved from one room to another, and it can be fitted with a thermostat if desired. Loadings available range from 750 to 3,000 W. The smallest size measures 14 in. by 30 in. by 7½ in., and the largest 39 in. by 30 in. by 7½ in.

Fused Connector Boxes

Unusually small projection, actually only ½ in. from the wall, is the main feature of the new M.K. fused connector boxes for electric clocks. Accidental interruption due to the plug being pulled out is impossible, as before it can be removed a lock-nut must be unscrewed. There are fuses in each pole rated at 1 A and made to B.S.S. 646/1935, and adequate provision is made for earthing. Both surface and sunk types in brown or white bakelite and with or without an iron box are obtainable from M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, London, N.18.



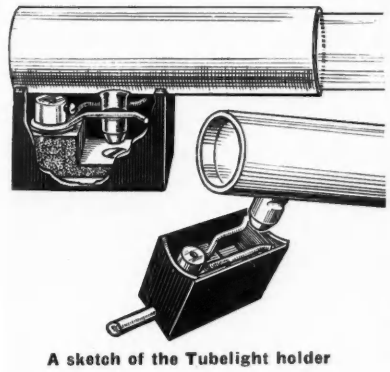
An M.K. fused connector box of the sunk type

Three-pin Shockproof Lampholders

Various types of shrouded and standard moulded lampholders are now made by J. A. CRABTREE & CO., LTD., Lincoln Works, Walsall, to take three-pin bayonet caps. In general design these are the same as the two-slot variety and are obtainable to take c.t.s. or twin flexible, in batten types or arranged as switch lampholders.

A Tubelight Holder

A holder for tubelight lamps, produced by TUBELIGHT HOLDERS, LTD., 11, Poultry, London, E.C.2, is neat in appearance, being made of block-moulded material. A phosphor-bronze clip is designed to eliminate burning of the contacts. The two ends are splayed outwards to facilitate the insertion of the projection on the tubelamp, which is then slid into position. The hooks of the holders at each end of the tubelamp should point in the same direction, and the leads may be taken out of any side of the holder. Fixing is by means of one screw.



A sketch of the Tubelight holder

A Floor Polisher

A new floor polisher has been introduced by VACTRIC, LTD., North Circular Road, Cricklewood, N.W.2.

The switch is conveniently situated at the top of the T-shaped handle, and can be controlled easily by the thumb when the handle is being held in a natural position. Two sets of three brushes are included with the equipment, one for applying the wax or polish and the second for removing superfluous wax and for polishing. The polishing brushes also work the wax into the grain of the lino or wood. They are easily changed by pressing on the brush ejector pins on the outside of the brush cover. The insertion of fresh brushes is equally as easy, as they are retained in place by a strong spring action.

The Vactric floor polisher

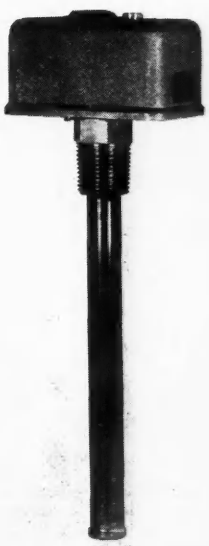
Two brushes revolve clockwise, and the third anti-clockwise, thus preventing "wandering" in one direction.

The motor bearings are self-lubricating, and the three-cornered shape of the brush cover gives access into corners the buffers fitted being of special non-marking rubber, while the transverse handle is designed to facilitate control and operation.

Each machine is provided with rubber-covered flex, giving a polishing range of 50 ft.

Thermostat for Water Heating Installations

A low-priced thermostat for water heating installations is now available from NATHAN & ALLEN, LTD., 131, Victoria Street, London, S.W.1. It is designed to operate at any temperature between 32 and 302 deg. F., the scale being ungraduated, but marked with "high" and "low" positions, and it can be set for a minimum variation of between 9 and 21 deg. F. It has metallic contacts and will carry 6 A on a.c. and 0.3 A on d.c. The overall length is only 7 in., the neck being screwed ½ in. gas for fitting into tanks.



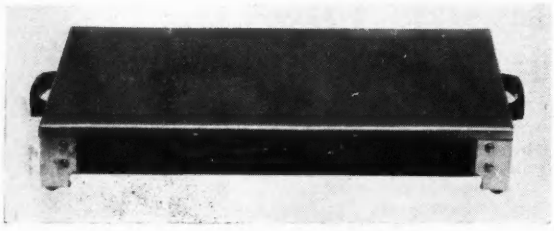
A Nathan & Allen thermostat

Domestic Apparatus from Canada

Several new domestic appliances of low price yet good finish are now being imported from Canada by the S.L.R. ELECTRIC, LTD., 17, Hanover Square, London, W.1. Of particular interest is a chromium-plated, double-sided, turn-over pattern "Radiant" toaster loaded at 575 W. A "Radiant" coffee percolator available in polished aluminium has a 6-cup capacity and a 400-W loading, while the somewhat more expensive chromium-plated "Brock" 4-cup model (400 W) can be supplied with a chromium-plated tray set to match.

A Plate Warmer

A plate and dish warmer is a new product of STOKES APPLIANCES, LTD., 28, Chandos Street, Buckingham Gate, London, S.W.1. It has a loading of 250 W and measures 18 in. by 10 in. by 2½ in. The use of aluminium for the top and corners renders the apparatus light, while a neat



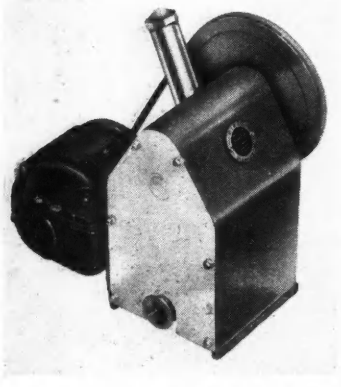
The Stokes warming plate

appearance is obtained by employing ebonite handles and sheet-metal casing finished in black. One or two refinements, such as polished reflectors under the elements, are being added to the appliance.

Diaphragm Pumps

Diaphragm pumps of a new design are being made by GIRDLESTONE & Co., 23, Davies Street, London, W.1.

The pump connecting rod, cam and ball-bearing layshaft are contained in a robust cast-iron housing and the drive between pump and motor is by means of endless moulded rubber V-belt. The pump is self-priming, even when perfectly dry and with an empty suction pipe, and is capable of a vertical suction of 24 ft.



The " Girco " diaphragm pump

A 4½-in. diameter rubber diaphragm reciprocates at the rate of 350 strokes per min. (although it is stated to be capable of 750); at this speed it has a maximum output of 500 gal. per min., or 150 gal. with a 100-ft. head. There is no packing gland and the housing is of cast iron, although the pump itself can be made in various materials according to the liquid to be pumped.

The makers state that the pump is unaffected by abrasives as it is not dependent upon a close internal fit for its efficiency. Silence in operation is another outstanding feature. The drive is by a ¾-h.p. motor.

A Table-top Cooker

A thermostatically controlled portable cooker, large enough to cook a dinner for 4-6 persons, is the latest addition to the products of H.M.V. HOUSEHOLD APPLIANCES, 363, Oxford Street, London, W.1. Oval in shape, the cooker has three separate compartments, which can be lifted out either separately or together, and both exterior and interior are vitreous enamelled. Decorative bakelite handles are provided both at the sides and on the heavy insulated stainless steel lid. Yellow and black rims add the finishing touch to the attractive appearance.

The H.M.V. heat-controlled cooker

Although the apparatus is rated at 1 kW. the average load is only about half that amount, due to the operation of the thermostat, a red light indicating when the required maximum temperature is reached.

The heat distribution is said to be remarkably even and there is no transference of taste between the various food containers. Cleaning is especially simple.

Domestic Electrical Appliances

HITHERTO, only refrigerators have been sold by the LIGHTFOOT REFRIGERATION CO., LTD., Bush House, Aldwych, London, W.C.2.

The company has, however, now made arrangements with the Westinghouse International Co. of America for the distribution of many additional domestic appliances in this country.

The Westinghouse dishwasher and " Spinner " clothes washer with dryer

Besides small apparatus, there is a new washer of attractive appearance. In this a ¼-h.p. rubber-mounted motor drives a new type of turbolator with upper and lower wings and multiple ribs with perforations. An adjustable-tension wringer with an instantaneous safety release is incorporated.

An electric ironer with a 26-in. roll is available, giving a pressure of 130-150 lb. This is also made in cabinet form, the shoe wattage being 1,300 in both cases. Another laundry item is the " Spinner " dryer and washer. This is a standard washer combined with a centrifugal dryer. It removes 30 per cent. more water than a wringer in a quarter of the time and takes the form of a porcelain enamelled cone, revolving at 1,000 r.p.m. The lid cannot be lifted with the spinner in operation.

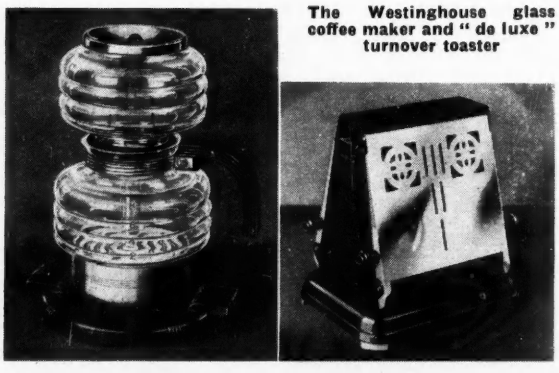
Another newcomer is the Westinghouse motor-driven brush cleaner which weighs less than 12 lb., being made of a special alloy. It has a head light, an air cushioned black rubber bumper, and a brush guard to prevent carpet fringes from becoming entangled. A toe-touch lever quickly releases the handle for the upright position, and a wide range of nozzle light adjustments is obtainable by turning a thumb screw. The " Hand-Vac " is made by the same company. It weighs only 5 lbs., and can be fitted with a long extension tube and floor nozzle, as well as a sprayer for moth-proofing.

Another cleaner is similar in general design to the revolving brush type but is fitted instead with a stationary brush and has no head lamp.

A new utility product is a portable dishwasher in white porcelain enamel with the dish tank cover in satin chromium. It measures the amount of water automatically and empties itself electrically, while it can clean fifty-five dishes and forty pieces of silver in one operation.

Among the smaller products which are being marketed by the Lightfoot company are the " Adjust-o-matic " thermostatically controlled " streamlined " iron, a thermostatic roaster-grill and a "food crafter," all of which have already been described in the ELECTRICAL REVIEW.

In addition, there is a matched toaster set with tray, a thermostatic three-heat 60-W warming pad, a matched 410 W urn set with tray and cups, a waffle baker (1,000 W), a new style of coffee and tea maker (600 W) in glass, a matched sandwich grill set with griller (660 W), plate, tray, &c., and a comprehensive range of synchronous electric clocks, including the " Perseus " numeral clock. There are also three designs of toasters, all of the turnover type and finished in chromium plate. The loadings are 400 and 500 W.



The Westinghouse glass coffee maker and " de luxe " turnover toaster

Parliamentary News (BY OUR SPECIAL REPORTER)

Wessex Electricity Bill

The Select Committee of the House of Commons on Unopposed Bills dealt on June 24th with the Wessex Electricity Bill. Capt. R. C. Bourne (Oxford, U.) presided. The Bill gives the Wessex Electricity Co. power to raise additional share capital of £800,000, and with the consent of the Electricity Commissioners additional loan capital of the same amount. The money is required for extensions and for the acquisition of other undertakings. The amount required for the latter purpose is estimated at £1,485,000. There is already power in earlier Acts to acquire undertakings authorised prior to 1929 within or adjoining the company's area, and it is now proposed to extend that to the acquisition of undertakings established since the end of 1928. In a report to the committee on this proposal the Minister of Transport said :—

"The Minister regards the proposal of the company to proceed to acquire their associated and other undertakings as a useful step towards the improvement of the organisation of the supply of electricity in their area of supply, inasmuch as the company would be enabled to deal with the problem of distribution in their area on a more comprehensive and unified basis than is possible at present owing to the existence of a number of separate distribution undertakings owned by separate companies. . . . Clause 4 of the Bill seeks in effect to enable the public purchasing authority (as defined in Section 37 of the company's Act of 1927) which is already authorised by Section 37 to purchase the company's undertaking under its Acts of 1927 and 1928, to purchase in addition any distribution undertaking which the company may have acquired. The existing power of the local authorities to purchase undertakings under the provisions of the Electric Lighting Act, 1888, are specifically preserved by Clause 3 (2) of the Bill. The Minister regards these additional purchase provisions as a further step in the direction of securing the consolidation of this area into one unit."

The Bill was ordered to be reported for third reading.

Kent Electric Power Bill

The same Committee considered the Kent Electric Power Bill on June 24th. Mr. Sidgwick, Parliamentary agent, said the Bill proposed a rearrangement of the capital. The priority shares now held by the County of London Electric Supply Co. were to be converted into preference shares and the class now known as "converted" ordinary shares would be known in future as ordinary shares. It was also proposed to increase the capital in order to bring the capital account into line with what had been actually spent. There would be an aggregate of £2,000,000 nominal capital authorised. The Electricity Commissioners had intimated to the company that the erection of the first section of a new selected station near Dartford in connection with the South-East England Electricity Scheme was urgently required. It was hoped that the cost of that station would be met by loan capital as it was the cheapest way of raising money.

After formal proof of the preamble the Bill was ordered to be advanced to the third reading stage.

Trolley Vehicle Extensions

Two Bills confirming provisional orders relating to trolley vehicles in Cleethorpes and Walsall were considered on June 29th by the House of Lords Committee on Unopposed Bills. In each case the Ministry of Transport acting under powers conferred by local Acts has authorised extensions of trolley vehicle routes. The Bills, which have already passed the House of Commons, were ordered to be reported for third reading.

Lancashire Power Bill

On the same day the Lords Committee considered the Lancashire Electric Power Bill. By this measure the company is authorised to raise additional capital for the extension of Kearsley generating station to meet the increasing demand for electricity. Formal proof was given of the preamble and the Bill was ordered to be reported for third reading.

Extension of Battersea Power Station

On June 24th Mr. H. Williams asked the Minister of Transport what was the present position of the application of the London Power Company to the Electricity Commissioners for consent to begin the erection of the second half of the Battersea power station and install a 100,000-kW set.

Dr. Burgin said that the London County Council and the other councils concerned had been afforded an opportunity of making representations and had notified the Electricity Commissioners that they did not offer any objection, provided that the consent was made subject to certain conditions for the avoidance of nuisance, which had already been applied in relation to the first part of the station. The Government Chemist's Committee was satisfied as to the efficacy of the gas washing plant at the station. The Minister of Health and the First Commissioner of Works concurred with him that, subject to these conditions, there was no objection to the proposed extension, and he was informing the Electricity Commissioners accordingly.

Sir P. Harris asked if the Ministry had consulted the defence departments about the danger of having so much power concentrated in the centre of London in a time of war.

Dr. Burgin said that the Minister for the Co-ordination of Defence had been consulted and had agreed.

In the Courts

Cable and Wireless (Holding) Capital Reduction

In the Chancery Division on Monday last Mr. Justice Simonds sanctioned the reduction of the capital of Cable & Wireless (Holding), Ltd., from £47,246,593 to £23,649,693. It was explained by Mr. F. Morgan, K.C., for the company, that creditors were not affected and no actual loss was set up. It had been found that the book value of certain holdings was excessive.

Counsel appeared for an opposing shareholder, and in approving the scheme Mr. Justice Simonds said that it was not desirable to discourage the feeling that a dissentient shareholder should come to the Court and he ordered the company to pay his costs.

Claim for Installation Work

In the King's Bench Division on June 24th Mr. Justice Swift entered judgment for £215 17s. 6d., with costs, in favour of Leonard G. Tate & Co., Ltd., electrical engineers, against Burley (Builders), Ltd., in respect of electrical installation work done by the plaintiffs at the defendants' property in Kensington Court, W. It was stated that the whole of the work done amounted to £315 17s. 6d., but judgment for £100 of that had been already obtained by the plaintiff company.

The defendants did not appear, and judgment was entered for the plaintiffs for the balance of their account, with costs, in default of defence.

Galloway Water Power Dispute

An appeal was heard on June 21st by the Court of Appeal consisting of Lords Justices Greer, Slesser, and MacKinnon, on the legal construction of a clause concerning road repairs and maintenance in connection with contracts made between Mr. A. M. Carmichael, public works contractor, Edinburgh, and the Galloway Water Power Co. Under the contracts Mr. Carmichael constructed hydro-electric works in Galloway and the sole question for the decision of the Court was whether on the legal construction of the clause Mr. Carmichael's liability as to roads was a general one for any damage which the contract works might have caused, as the contractor contended, or whether this liability fell to be assessed on a fixed scale under the clause.

In terms of the contract between the parties, provision was made for the payment by the contractor upon the basis of so much per ton mile of plant, material, and things used by him in carrying out his contract. The contract also provided for limitation upon the loads carried by the contractor over the roads in Kirkcudbrightshire and Ayrshire. An arbitration in connection with the matter took place some time ago before Sir George William Humphreys, M.Inst.C.E., who decided in favour of the Galloway Water Power Co. Mr. Carmichael appealed against the decision of Sir George Humphreys and Mr. Justice du Parcq, who heard the appeal upon the legal question involved, decided in favour of the company. Mr. Carmichael took the matter to the Appeal Court.

The Court unanimously found for the company's instruction of the clause, and awarded it costs against the appellant.

Radio Patent Action

The Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Scott, on Tuesday, after hearing arguments lasting seventeen days, reserved judgment on the appeal of the defendants from the judgment of Mr. Justice Luxmoore in the Chancery Division in the action brought by Electric and Musical Industries, Ltd., and the Boonton Research Corporation against Lissen, Ltd., and G. Ralis for an injunction (and the usual ancillary relief in a patent action) restraining the defendants from infringing the plaintiff's letters patent for "Improvements in electric wave amplifying apparatus" for use in wireless receiving sets.

Supply to Wirral Railway

In the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Scott on Tuesday, Mr. Alfred Tylor applied for a day to be fixed for the hearing of the appeal which had been entered by the plaintiffs in the case of the Attorney-General (at the relation of the Birkenhead Corporation) against the Liverpool Corporation and the London, Midland and Scottish Railway Company, from the judgment of Mr. Justice Simonds in the Chancery Division, delivered on April 29th last. Counsel stated that he appeared for the defendant railway company which was anxious that an early date for the hearing of the appeal should be fixed as it was anxious to get on with its electrification scheme in the district.

The Master of the Rolls stated that the Court would hear the appeal on July 21st (subject to any appeal then part heard).

Business and Industrial Notes

The Week's News. Showrooms and Exhibitions. New Installations. Overseas Trade. Publicity Material. Trade Announcements. Prices of Materials. Liquidations and Bankruptcies.

The Empire Exhibition, Glasgow

So great has been the demand for space at next year's Empire Exhibition, Scotland, that a second Palace of Industry is to be erected in Bellahouston Park, Glasgow, where the Exhibition opens next May. Although the Palace of Industry now being built will cover more than 2½ acres, a companion building will be needed to meet the space demands of prospective exhibitors. Numerous allocations have been made in the Palace of Engineering, the largest building, which covers nearly 5 acres.

Poplar Electricity Showrooms

The Poplar Electricity Committee is to obtain tenders for the reconstruction and extension of its showrooms, at an estimated cost of £37,500.

Australian Tariff Changes

Colonel White, the Australian Minister for Trade and Customs, introduced in the House of Representatives, Canberra, on June 24th a tariff schedule containing 150 items and sub-items. Among these is a group of seventeen items increasing the duties on goods now made economically in Australia, including hand-set telephones, certain static transformers, and various other electrical devices.

Novel Cooker Publicity

A novel and effective leaflet has been issued by the Lancashire Electric Power Co. in its campaign to popularise electric cooking. The leaflet contains actual photographs taken in many farm kitchens and kitchens in small industrial towns and residential districts in the company's area. Accompanying each photograph is a tribute to electric cooking in the actual words of the cooker user.

Lighting Service Bureau Alterations

The main demonstration room and the architectural lighting studio at the E.L.M.A. Lighting Service Bureau are now in the course of reconstruction in readiness for the autumn. New demonstration equipment is being added, and with the inauguration of these new rooms in September the industry will find that the Bureau is equipped better than ever to deal with its problems. In the meantime, the usual service of the Bureau is in no way interrupted and the rooms which are not under reconstruction are available for inspection.

Automobile Showroom Lighting

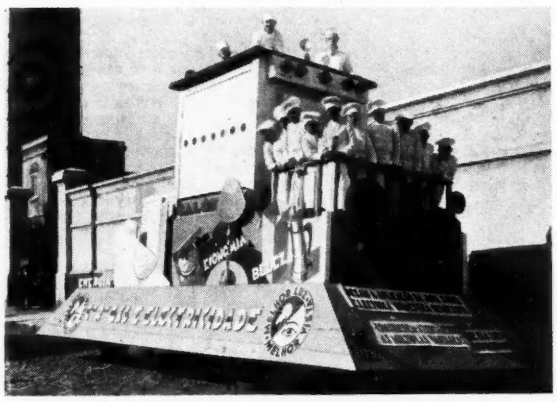
The lighting of the new service station and showrooms recently erected for the Standard Motor Co., Ltd., at Canley, is in accord with this fine new structure. Lee Beesley & Co. carried out the installation to the requirements of Mr. F. A. Johnson, works engineer, G.E.C. lighting fittings, floodlight projectors and "Osram" and "Osira" lamps being employed. The main entrance is floodlighted in two colours by eleven units equipped with 400-W "Osira" colour floodlighting lamps (flooding in red) positioned on the grass verge at ground level

The demonstration room of the Standard Motor Co., Ltd., lighted by G.E.C. fittings and lamps

in front of the building, and ten units fitted with amber colour-screens and equipped with 500-W "Osram Class B" projector lamps. The latter are used for contrasting colour lighting above the balcony, the units being fixed above the showroom windows. The showrooms are illuminated by eleven specially designed ceiling fixtures each of which measures 36 in. by 21 in. and is equipped with six 60-W lamps. Similar fittings are installed in the waiting room. The demonstration room is illuminated to a high intensity by totally enclosed "Britalux" low absorption glassware fittings. The café, which is attached to the building, is similarly lighted.

Electrical Propaganda in Portugal

Evidence of the attention which is being devoted by the Companhias Reunidas Gaz e Electricidade, of Lisbon, to developing the use of electricity for domestic purposes is afforded by the accompanying illustration which depicts an attractive tableau in a recent carnival procession in the



An electrical tableau in a Portuguese carnival

Portuguese capital. The centre piece of the display took the form of a large model of an electric cooking stove, the interior of which formed a platform for three men dressed as chefs, while forward of this was another railed platform for ten small boys, who, dressed as kitchen assistants, distributed leaflets to the public as the procession passed along the main thoroughfares of the city. The sides were painted in attractive colours bearing pictures of various household appliances, such as coffee percolators, electric irons, table lamps, &c., while prominence was also given to the slogan *Melhor Luz—Melhor Vista* ("Better Light—Better Sight.")

B.E.A.M.A. Annual Dinner

The annual dinner of the British Electrical and Allied Manufacturers' Association is to be held at Grosvenor House, Park Lane, London, W.1, on Thursday, November 4th. Lord Derby, the president, will be in the chair.

Irish Lamp Factory to Reopen

The lamp manufacturing section of Solus, Teoranta (Light, Ltd.), Bray, Irish Free State, which was closed recently as a protest against the flooding of the market with Japanese and other foreign lamps, is to reopen following a Government Order prohibiting the importation, save under licence, of electric filament lamps of voltages from 4 to 35 and from 100 to 250 and wattages from 1 to 1,500, with certain exceptions. Mr. J. J. Walsh, chairman of the company, states that the agreement with the Government is for the production of lamps of equal quality to those produced by the English combine and at no higher price, and that under the new Order these conditions can be comfortably fulfilled.

Incorporated Institution of Radio Engineers

The Incorporated Institution of Radio Engineers, Ltd., was registered on June 23rd as a private company limited by guarantee, without share capital. Each member is liable for 10s. in the event of winding up. The objects are to foster and advance the art and science of radio, television, sound engineering, sound pictures and short wave engineering, and every branch of these and allied subjects as applied to serve the best needs of humanity, to encourage research and hold conventions and exhibitions, to hold examinations and grant diplomas and certificates, to grant the holders of such diplomas and certificates the right to describe themselves as "incorporated radio engineer" or "incorporated television engineer," and to holders of the Institution's certificates to describe themselves "certified radio engineer" or "certified television engineer," to grant to holders of associateship, associate membership, membership and fellowship diplomas, the right to use the affixes A.I.R.E., A.M.I.R.E., M.I.R.E., F.I.R.E., &c., and to acquire (1) the company known as the Guild of Incorporated Radio Engineers, Ltd., 12, St. Stephens Square, W.2, (2) the goodwill of the Institution of Radio Engineers, Northern Division, 47, Market Street, Manchester, (3) the company

known as the Institute of Radio Engineers, Ltd., 22, Eastbourne Terrace, W.2, and (4) the goodwill of the Institution of Radio Engineers, of London, registered business name the property of R. W. Gorman, 14, Cursitor Street, E.C.4, together with the copyrights invested in the said firms and person (including three copyright designs reproduced in the Memorandum of Association). The income and property of the Institution (whencesoever derived) shall be applied solely towards the promotion of its objects, and no profits shall be paid or transferred directly or indirectly by way of bonus, dividend or profit to any member of the Institution, provided that this shall not prevent the payment in good faith of reasonable and proper remuneration to any officer or servant of the Institution for service rendered to the Institution or to any education body, society, Government Department, school, college or university that the officer or servant may be loaned to for special duties. The subscribers are: R. Wm. Gorman and T. Fredcrick, both of 12, St. Stephens Square, W.2. The first directors are not named. The company may in general meeting appoint permanent directors. Secretary, R. W. Gorman.

Popularising Electric Vehicles

To stimulate the use of electric vehicles, Partridge, Wilson & Co., Ltd., are offering cash prizes of ten, five and three guineas for the three best suggestions submitted by August 31st for the development or improvement of their vehicles.

I.F.S. Electrical Imports

Imports of electrical goods and machinery into the Irish Free State during the first five months of this year show a marked rise in value as compared with the corresponding period of 1936, being £438,578 as against £375,266. The largest increase occurs in the case of telephone and telegraph apparatus, imports being valued at £44,166 as against £4,645. On the other hand, imports of lamps declined in value from £22,924 to £10,152.

	January–May, 1936.	1937.
	£	£
Electric motors	24,418	21,629
Other electrical machinery, not enumerated separately	85,441	99,435
Complete dry batteries	4,525	5,613
Dry battery parts	1,978	1,353
Electric lamp bulbs	22,924	10,152
Electric lighting accessories, fittings and parts	36,405	34,049
Insulated electric wires and cables	34,057	33,685
Telegraph and telephone apparatus	4,645	44,166
Radio receivers, complete	19,677	27,356
Radio gramophones, complete	646	507
Other radio apparatus, fully or substantially assembled	3,490	4,218
Component parts and accessories	30,042	34,488
Other electrical goods and apparatus	107,018	121,927
Total	£375,266	£438,578

French Domestic Electrical Imports and Exports

The appended table shows the French imports and exports of domestic electrical appliances during last year as compared with 1935. The French fr. values have been converted to sterling at the value of 110 to the £:—

IMPORTS.

	1935. 1,000 fr.	1936. 1,000 fr.
Electric fires and stoves	3,038	4,330
Electric irons	57	119
Electric vacuum cleaners, boot cleaners, etc.	2,214	2,752
Electrical refrigerators, etc.	13,458	11,812
Electric fans	631	427
Total fr.	19,398,000	19,440,000
Total at 110 fr. to £	£176,345	£176,730

EXPORTS.

All classes of appliances	8,750,000 fr.	10,002,000 fr.
Total at 110 fr. to £	£79,545	£90,930

Japanese Lamp Exports

A report from Tokio states that the exports of Japanese electric lamps, which declined from 310 millions in 1934 to 194 millions in 1935, rose to the record level of 314 millions in 1936 of the value of 9.8 million yen.

Dorman and Smith

On page 973 of our last issue we published a notice of a meeting of Dorman & Smith, Ltd., to hear an account of the winding-up of the company. This liquidation is purely a formal one for reconstruction purposes. The business has been taken over by a new company, Dorman & Smith (1937), Ltd., and there has been no change in the personnel of the board, staff and workpeople.

The National Library of Wales

The magnificent buildings of the National Library of Wales, which will be opened by Their Majesties the King and Queen on July 15th, have been under construction since 1916. The electrical installation of this imposing structure is on a 3-wire 230-460-V d.c. supply, and the whole of the wiring from the commencement has been with Henley v.i.r. wires in solid-drawn enamelled steel conduit. Ordinary lighting points are used throughout, the majority of which are of the plain pendant pattern with the usual pilot lighting on two-way and intermediate switching along main corridors, &c. All special fittings installed are of solid bronze, including six special pillar standards outside on the terraces, and the plates covering the flush switches. The outside standards and the special fittings in the Council Chamber and Gallery are all to the special design of the architects, Messrs. Adams, Holden & Pearson, of London. Twelve heating plug points have been installed for auxiliary heating, four of which are to supply built-in type radiators fixed in the Council Chamber, and in the librarian's and president's rooms. The remaining eight supply ordinary 15-A 3-pin switch sockets. The main switchboard is in a detached building and consists of an ironclad main switchboard with switch fuses controlling the various sections and departments. Various paper insulated and lead covered cables feed out from the switchboard, *via* subways, into the building to supply lighting, heating and power. Motors ranging from 1 to 5 h.p. have been installed to operate passenger lifts, printing machines and other plant, and there are also ultra-violet-ray apparatus and mercury lamps in connection with the old print and manuscript department. The installation was carried out by Cox-Walkers, Northallerton. Illustrations of the building appear on page 12.

New Paraguayan Customs Duties

The Paraguayan Government has issued a decree abolishing the tax on imports as from July 1st and replacing it by a Customs duty of 0.5 per cent. *ad valorem* on imports and 0.2 per cent. on exports.—*Reuter* (Asuncion).

Passing Henley's Factory

An original painting, specially executed by Mr. Frank H. Mason, depicting one of the last of the windjammers sailing past the North Woolwich factory of W. T. Henley's Telegraph Works Co., Ltd., is reproduced on the cover of the ninth birthday number (June) of the company's journal *Distribution of Electricity*.

Works Visits

During the recent summer meeting of the Institution of Mechanical Engineers at Leicester members paid a visit to the Rugby Works of the British Thomson-Houston Co., Ltd. They were welcomed at the luncheon by Mr. H. N. Sporborg (director and chief engineer), response being made by Dr. G. G. Stoney and Major P. J. Cowan.

On June 17th members of the same Institution paid a visit to the Willans works of the English Electric Co., Ltd., where they inspected steam turbines, water turbines and oil engines in course of manufacture. The visitors were also shown a display of apparatus from the company's other works, including examples from the switchgear, fusegear, transformer and meter departments, Stafford, and from the dynamo and motor department, Bradford.

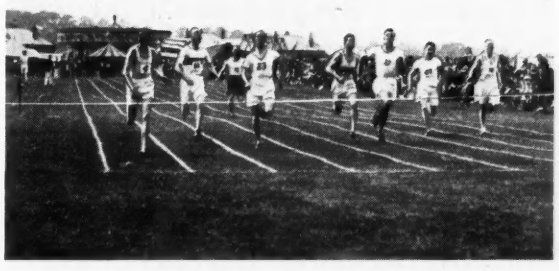
On June 18th and 22nd the Willans works were visited by a large number of other engineers from various parts of the country, together with representatives from the company's branch offices.

Over eighty members of the Association of Supervising Electrical Engineers and their friends visited the Pinewood Studios, Iver Heath, last Saturday. The party was received by Mr. F. V. Hauser, chief engineer of the studios.

Social Events

On June 19th about sixty foremen and charge hands of David Brown & Sons (Hudd.), Ltd., went by bus to Liverpool and *via* the Mersey Tunnel to Birkenhead, where they inspected the works of Cammell Laird & Co., Ltd. After lunch at the Stork Hotel, Liverpool, the party was shown the main control room, blowers, and extractors for the ventilating system, pumping plant, &c., of the Mersey Tunnel. Following tea at New Brighton the party proceeded home *via* Chester and Stretford.

The tenth annual sports meeting of the Pirelli-General Social and Sports Club was held on June 19th, at their sports ground, Eastleigh, and despite a rather cloudy afternoon there was a record attendance of over 4,000 people. Among the chief



The men's 100-yards final at the Pirelli-General sports

events were the men's inter-departmental relay for the "Railing" Cup, which was won by Rubber Cable "A," Southampton, and the "Palmer" Cup for the ladies inter-departmental relay which was also won by Rubber Cable "A," Southampton. The aquatic events in the company's own swimming pool were also well patronised, and many novel competitions were arranged. Varied entertainments were provided for non-competitors including an amusement park with

its numerous attractions. Competitive events were provided for the wives and children of the members of the club and were well supported. Prizes for the various events were presented by Mr. G. Martinez, director and general manager of the company. The various events of the day were succeeded by dancing on the green and in the pavilion until midnight.

Members of the staff of the Weald Electricity Supply Co. visited Margate on June 19th on the occasion of their sixth annual outing. The journey was made by coach, and luncheon (presided over by Mr. N. W. S. Halsey, chairman of the Sports and Social Club) was taken at the Fort Paragon Hotel, Cliftonville. Telegrams of good wishes were received from Sir Bernard Greenwell and Sir Robert Renwick, directors of the company, and a personal message from Mr. J. C. Dalton, manager and secretary of the County of London Electric Supply Co. and president of the Sports and Social Club. The party was accompanied by Major C. B. Grace, managing engineer, and Mrs. Grace.

The Chelmsford works of Crompton Parkinson, Ltd., held their annual sports on June 19th. There was a full afternoon of sporting events, and at the conclusion the prizes were presented by Mrs. Frank Parkinson, who was accompanied by Mr. Frank Parkinson.

The Ideal Home Exhibitors' Golfing Society spent a pleasant day at Stoke Poges Golf Club on June 24th when they competed for the Vactric Challenge Cup. The cup was won by Mr. A. A. Holt, hon. sec. of the Society, and the runner-up was Mr. J. W. Ford. In a bogey four-ball competition the following all tied with scores of five up on bogey: R. Berry and L. McCardle, S. W. Brill and A. A. Holt, C. H. R. Wass and H. Bowers. The prizes were presented by Mr. C. H. R. Wass, vice-president of the Society.

London Associated Electricity Undertakings, Ltd., is holding its first flower show at 254, Earl's Court Road. The display was to be officially opened yesterday (Thursday) by Mrs. Rivière, wife of the engineer-in-chief.

Electricity Supply Rifle League

As a result of the matches during May the leading clubs in the various divisions of the Electricity Supply Rifle League are as follows:—First division: Shoreditch "A." Second division: City "D." Third division: Barking "B." Fourth division: Barking "C."

Northants Agricultural Show Award

At the Northamptonshire Agricultural Show held at Kettering last week the combined stand of the Northampton Electric Light & Power Co., Ltd., and the Kettering Electricity Department obtained the silver medal and certificate for the "best general collection exhibited."

Display of Domestic Apparatus

In connection with the annual conference of the Electrical Contractors' Association at Llandudno last week the English Electric Co., Ltd., opened temporary premises on the Pier walk, next to the Grand Hotel. Products exhibited included cookers, fires and irons. A mechanically operated display featuring the company's "Ritemp" thermostatically controlled cooker attracted much attention.

Electricity Offices for St. Marylebone

St. Marylebone Electricity Committee has approved plans for the erection of electricity buildings in Aybrook Street at a cost of £55,000.

P.O. Engineers and Forty-hour Week

At the annual conference of the Post Office Engineering Union at Scarborough on Tuesday a resolution was passed asking the Postmaster-General to reconsider the Union's claim for a 40-hour working week.

Commercial Cooking at Great Yarmouth

Referring to the note on page 970 of our last week's issue, John Rouse (Oldham), Ltd., inform us that the loading of the electric fish fryer illustrated was 95 kW, not 83 kW. The claim that this is the largest apparatus of its kind yet made is therefore still more likely to be correct.

Superlamp, Ltd.

This company informs us that it is going into voluntary liquidation for reconstruction purposes, the liquidator being Mr. H. E. Spry, 19, Fenchurch Street, E.C.3. A new company is being registered under the same title to take over all the assets and liabilities and to continue the business under the same directors and management. All debts will be paid in full by the new company.

The Royal Lancashire Show

The Royal Lancshire Agricultural Show is to be held at Manchester this year from July 29th to August 2nd. The Manchester Corporation Electricity Department and a number of neighbouring electricity supply authorities intend to present a comprehensive display of agricultural and domestic electrical appliances and also a full-scale model of a farmer's kitchen, showing the housewife how the cooker, water heater, washing machine, ironer, &c., can be used to simplify the domestic services of the modern farm. All the catering on the showground, including water heating, tea making, &c., in a considerable number of stands and small refreshment booths, will be done electrically. The restaurant staff expects to deal with over 3,000 meals per day, in addition to teas.

Trade Announcements

Owing to the re-naming of Arthur Street the address of Pope's Electric Lamp Co., Ltd., is now "Elasta House," 5, Earnshaw Street, New Oxford Street, W.C.2.

Mrs. Frank Parkinson presenting the prizes at the Crompton Parkinson sports. Mr. Frank Parkinson is seen immediately behind her

Mr. A. N. D. Kerr, A.M.I.E.E., has set up office in Birmingham as an electrical engineer and small motor agent and in future his address will be Service House, 1, Fleet Street, Birmingham, 3 (telephone: COLmore 4334; telegraphic address: Andykar Birmingham). Mr. Kerr has been appointed sole Midlands agent for the Croydon Engineering Co., and agent for the Tuscan Engineering Co., Ltd.

The Broadway Engineering Co., Ltd., of 36, Victoria Street, Westminster, S.W.1, has acquired new premises which include ample accommodation and showrooms to demonstrate and service their products. These premises are situated in Carlisle Road, Hendon, London, N.W.9, and have a total floor space of approximately 11,000 sq. ft.

Grierson, Ltd., have removed their offices to 195-203, Waterloo Road, S.E.1 (telephone: Waterloo 4575).

Owing to continued expansion of business the J. P. Tubular Heater Co., Ltd., has moved its London offices and stores to larger premises at 27/29, Furnival Street, E.C.4 (telephone, Holborn 0375). Large stocks of tubular and convector heaters, &c., are now carried for immediate delivery.

The General Electric Co.'s Southampton branch has been moved to Magnet House, Commercial Road. The telephone number and telegraphic adddress are unchanged.

The Union Electric Co. has moved its offices to 2, Forresters' Hall Place, Clerkenwell, London, E.C.1 (telephone: Central 5311).

The Magna Wire & Cable Co., Ltd., is moving next Monday to larger premises at 87, Southwark Street, London, S.E.1 (telephone: Waterloo 4345; telegraphic address: Wyrmagna, Boroh, London).

A Supply Company's New Offices

The new offices of the Midland Electric Corporation for Power Distribution, Ltd., at Tipton, were formally opened on June 17th by Mr. G. H. Nisbett, chairman of the company, who said that in the early days of the company Birmingham was a more convenient centre than Ocker Hill, and, later, district offices were opened. There appeared a need for co-ordinating the district offices in a centre more convenient than Birmingham, and so they decided on that centre at Toll End, Tipton. The opening ceremony took place in the afternoon and was followed by a dinner in the evening, when Mr. Nisbett, in reply to the toast of the company, said that it was devastating to have a Government proposal which would put into the melting pot all that had been built up in the way of organisation of the electricity distribution business over many years. The only excuse there could possibly be for the drastic changes proposed was that economies would result, with a consequent benefit to the consumer. He was unable to see any possible appreciable savings, either in capital or administration charges, even if one took the long view. This reorganisation would not tap a potential load of any magnitude. Developed areas were obtaining an efficient service, so that the only new load it would bring in would be rural supplies in undeveloped areas. So far as their company was concerned no village was without a supply in the chief centre of population, although a few isolated premises had no supply immediately available. Dealing with the financial aspect, he said that the business in each area was to be run, in practice, from Whitehall, which would dictate from time to time the conditions of supply and the prices charged to consumers, and, therefore, the financial results. The district authorities it was proposed to set up would, however, apparently be responsible

for raising the money necessary to run the business. He could not conceive how, in these circumstances, they would be able to write a prospectus sufficiently attractive to ensure the subscription of the necessary funds. The present proposals were,

"Osira" colour floodlighting and fluorescent tubular lighting were prominent features of the General Electric Co.'s display at the exhibition held last week at Harrogate in connection with the annual conference of the Cinematograph Exhibitors' Association

in effect, going to nullify all the legislation that had been passed with regard to electrical distribution since the first disastrous Act of 1882, which for a time entirely stopped all development of electricity supply.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, ETC.	Price. June 30th.	Fortnight's Inc. or Dec.
a Acid Oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£36	—
a Ammonia, Muriate (large crystal) ... ,,	£18 10s.	—
a Borax ... ... ,,	£17	—
a Copper, Sulphate ... ... ,,	£15 10s.	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¼d.	—
a ,, Perchlorate ... ... ,,	6d.	—
a Shellac ... ... per cwt.	£4 18s.	—
a Sulphur, Commercial ... ... per ton	£11	—
a ,, Roll ... ... ,,	£11	—
a Soda Chlorate ... ... per lb.	3¼d. to 3¾d.	—
a ,, Crystals ... ... per ton	£5 to £5 5s.	—
a Sodium Bichromate, casks ... ... per lb.	4d. nett.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£100 to £105	—
b ,, Wire ... ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil ... ... ,,	1/3 to 2/9	—
p Babbitts Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£237	£7 inc.
Grade II ... ... ,,	£165	£5 inc.
Grade III ... ... ,,	£88	£1 inc.
c Brass (rolled metal 2" to 12" basis) ... per lb.	9¼d.	¼d. inc.
c ,, Tubes (solid drawn) ... ... ,,	1/0¼ to 1/0¾	¼d. inc.
c ,, Wire, basis ... ... ,,	9¾d.	—
c Copper Tubes (solid drawn) ... ,,	1/2¼d.	¼d. inc.
g ,, Bars (best selected) ... ... per ton	£93	£2 inc.
g ,, Sheet ... ... ,,		
g ,, Rod ... ... ,,		
d ,, (Electrolytic) Bars ... ... ,,	£62	—
d ,, ,, Wire Rods ... ,,	£67	—
d ,, ,, H.C. Wire ... per lb.	9¾d.	—
f Ebonite Rod ¼" dia. & up ... ... ,,	1/10 to 2/9	—
f ,, Sheet ⅛" thick & up ... ,,	1/7 to 1/10	—
n German Silver Wire, Nos. 1 to 12 ... ,,	2/5	—
h Gutta-percha, fine ... ... ,,	nom.	—
h India-rubber, Para-fine ... ... ,,	10d.	½d. dec.
i Iron, Pig (Cleveland, No. 3) ... per ton	£4 5s. 0d.	—
i ,, Wire galv. No. 1, P.O. Qual. ... ,,	£23	—
g Lead, English Pig ... ... ,,	£25 5s.	£2 5s. inc.
g Mercury ... ... per bot.	£15 5s.	—
e Mica (in original cases) small ... per lb.	10d. to 2/–	—
e ,, ,, ,, medium ... ,,	6/– to 12/6	—
e ,, ,, ,, large ... ,,	13/– to 17/6 up	—
p Phosphor Bronze, plain castings ... ,,	1/3½	—
p ,, ,, drawn bars & rods ,,	1/3½	½d. inc.
p ,, ,, rolled strip & sheet ,,	1/1½	½d. inc.
p ,, ,, wire ... ... ,,	1/2½	½d. inc.
o Platinum ... ... per oz.	£10	15s. dec.
d Silicium Bronze Wire ... ... per lb.	10 11/16d.	—
g Spelter ... ... per ton	£21 10s.	£2 10s. inc.
r Steel, Magnet, in bars ... ... per lb.	7¾d.	—
g Tin, Block (English) ... ... per ton	£253 10s.	£10 10s. inc.
m ,, Wire, Nos. 1 to 16 ... ... per lb.	4/3	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.
r W. F. Dennis & Co.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in our "Business Notes" under the same heading.

Orders Recently Booked

Orders have been received during the past few months by Bull Motors for "Super Silent" motors for the following buildings:—Queen's Hall, London; U.S. Government Buildings, London; Central Middlesex County Hospital; Leicester Municipal Offices; Manchester Royal Infirmary; Central Hotel, Glasgow; C.W.S. Buildings, Lowestoft; Earls Court Exhibition Buildings; and Dolphin Square flats (repeat orders).

The Marconi International Marine Communication Co., Ltd., has received instructions to carry out the wireless installations on the two new P. & O. liners *Stratheden* and *Strathallan*.

Orders for twenty steam locomotives, eleven light Diesel shunting locomotives, and fifty steel tank wagons have been placed with British companies by the Buenos Aires Great Southern and the Buenos Aires Western Railways. These will cost approximately £300,000, and will take nine months to complete. The locomotives will be built by the Vulcan Foundry and the English Electric Co., Ltd.

New Showrooms for Stepney

The Stepney Borough Council is proposing to purchase a site at 139-141, Whitechapel Road for the erection of electricity offices and showrooms.

New Catalogues and Lists

Dorman & Smith (1937), Ltd., Manchester.—A leaflet illustrating and describing an interlocked switch and connector with transformer and also a few of the company's stock designs of hand-lamps.

British Electrical Repairs, Ltd., 218, Witton Lane, Birmingham, 6.—Details of the company's repair work.

H. J. Scott & Co., Ltd., Volt Works, Ravenhill Avenue, Belfast.—A stock list of electric motors.

C.A.V.-Bosch, Ltd., Acton, London, W.3.—Working particulars for control boards, regulators and cutouts.

Hopkinsons, Ltd., Huddersfield.—Details of the company's return trap for boiler feed water supplies.

British Klöckner Switchgear, Ltd., 21, Richmond Place, London, S.W.8.—A 48-page price list of switchgear.

British Oxygen Co., Ltd., Thames House, Millbank, London, S.W.1.—A technical booklet dealing with aluminium welding.

Renold & Coventry Chain Co., Ltd., Coventry.—An illustrated booklet dealing with chain drives.

British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.—A 26-page illustrated catalogue of "Mazda" projector lamps.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Decorative illumination by means of "Osira" fluorescent tubes is illustrated in colour in a 36-page brochure.

Bankruptcy Proceedings

S. W. Bridges, Melgund Road, Highbury (lately trading as British and American Radio Service Co.), 10-11, Field Place, St. John Street, Clerkenwell, and 219, Pentonville Road, N.—The statutory first meeting of creditors was held on Monday at London Bankruptcy Buildings, when accounts were submitted showing liabilities of £466 against assets of £77. Debtor attributed his failure to bad trade, lack of capital and heavy overhead expenses. The case was left with the Official Receiver to be wound up in bankruptcy.

W. R. Mew, "Silvermere," Lushington Hill, Wootton, Isle of Wight, Hants, formerly carrying on business at Bembridge and St. Helens, Isle of Wight, wireless and electrical engineer.—The public examination herein should have been held at the Town Hall, Newport, Isle of Wight, recently, but debtor did not attend and the case was adjourned.

C. J. Tann, radio engineer, "Brianscot," Station Road, Wootton, I. of W.—First meeting July 2nd at 87, High Street, Portsmouth. Public examination July 7th at the Town Hall, Newport, I. of W.

G. Ireland, electrical engineer, near the Oak Inn, Fambridge Road, Maldon.—First and final dividend of 20s. in the £, payable July 6th at 29, Russell Square, W.C.

L. H. Howard, electrical engineer, 10, Woodland Park, Girton, Cambridge.—Receiving order made June 17th on debtor's own petition. First meeting July 2nd at 41, Sidney Street, Cambridge. Public examination July 28th at the Guildhall, Cambridge.

E. Mankellow, electrician, 2, Holly Cottages, Ascot Place, Ascot.—Public examination July 2nd at the Town Hall, Windsor.

F. R. Keenan, electrical engineer, 104, Cheltenham Road, Evesham.—Public examination July 13th at the Guildhall, Worcester.

Company Liquidation

British Electrical & Engineering Co. of China, Ltd.—Meeting July 26th at Spencer House, South Place, E.C.2, to receive an account of the winding-up by the liquidator, Mr. C. C. Baker.

Private Arrangement

A. E. Wilmott, Ltd., electrical engineers, 417, Lincoln Road, Peterborough.—A private meeting of the creditors of the above was held recently at Peterborough, when the statement of affairs showed ranking liabilities of £2,639, of which £2,231 was due to sundry creditors, and there was a partly secured creditor for £997, holding security valued at £588. The total assets were £3,533, leaving a surplus of £914. The issued capital was £1,316. There was a footnote to the statement to the effect that there was a contingent liability to two creditors on an uncompleted contract amounting to approximately £1,000. No amount had been included against that liability and the debt outstanding on completion of the contract would be £991. There were also contingent liabilities for service contracts still running. The company was registered in May, 1934, and had been carried on by A. E. Wilmott up to April last, when he met with a fatal accident. It was decided that steps should be taken to put the company into voluntary liquidation.

Electricity Supply

Aylesbury.—SUB-STATION CONSTRUCTION.—The Town Council is to erect an additional sub-station in Chiltern Street at a cost of £200 and is to purchase land in Limes Avenue for another.

Bexhill.—REVISION OF HIRE CHARGES.—In view of the increasing cost of appliances the Electricity Committee recommends the revision of hire charges to new applicants so that the rentals received shall not be less than 12½ per cent. per annum on the net cost of the appliances.

Blackburn.—RURAL SUPPLIES.—The Electricity Committee proposes to extend the supply of electricity to Balderstone. In recent years the electrification of Blackburn's rural areas has proceeded rapidly, practically every district now being covered.

Burnley.—FINANCING DEVELOPMENT.—A loan of £30,000 is required by the Electricity Committee to cover anticipated expenditure on mains and services up to March 31st, 1940.

Canada.—POWER CONTRACT UPHELD.—According to the *Financial Times*, the Beauharnois Light, Heat and Power Co.'s contract to supply power to the Ontario Hydro-Electric Commission, despite provincial legislation to the contrary, has been upheld by the Ontario Court of Appeal. Mr. Mitchell Hepburn, Premier of Ontario, after hearing the judgment, declared that an appeal will be placed before the Judicial Committee of the Privy Council. He is taking steps to implement the legislation passed last Session to forbid the execution of Court decisions against the Hydro-Electric Commission and "to make effective the purpose" of the 1935 Power Commission Act. The decision of the Court of Appeal confirms the ruling of the Supreme Court on January 14th. The Power Commission Bill invalidating certain contracts between the Ontario Hydro-Electric Commission and four Quebec power companies (in which British capital is concerned) was passed through the Ontario Legislature in April, 1935.

Chester.—ILLUMINATIONS.—The Development Committee recommends that no illuminations shall be provided in the spring of next year. Those this autumn are to be extended until October 13th on account of the conference of the National Chamber of Trades to be held in the city. For this display the electrical engineer has been instructed to concentrate mainly on the illumination of the river and gardens.

COMPANY'S OFFER REFUSED.—The Mid-Cheshire Electricity Supply Co., Ltd., wrote to the Electricity Committee stating that the directors had decided to formulate a scheme in regard to group 17 of the schedule of the memorandum of the Ministry of Transport. In order to facilitate such a scheme the directors were prepared to make an offer for the purchase of the Corporation's electricity undertaking, and they asked if the Corporation was prepared to consider such an offer. It was resolved that the company should be informed that the Corporation could not consider any offer made by the company for the purchase of its undertaking.

Durham.—ELECTRIC LIGHTING IN SCHOOLS.—The Board of Education has approved a proposal of the County Education Committee to install electric lighting in the Catchgate and Low Coniscliffe schools.

Formby (Lancashire).—REVISED TARIFF.—The electricity tariff has been revised. The lighting flat rate is reduced from 7d. to 6½d. per kWh; two-part tariff domestic consumers will in future pay 5 per cent. per quarter on the rateable value of their premises (minimum charge 15s. and maximum £3), plus ½d. per kWh; the two-part tariff for lock-up shops or combined houses and shops is 7½ per cent. per quarter (minimum charge 22s. 6d. and maximum £6), plus ½d. per kWh; for large premises, schools and halls the tariff is the existing special fixed quarterly charge plus ½d. per kWh.

Glasgow.—FARM EQUIPMENT.—The Health Committee has authorised the medical officer of health to arrange for the installation of milking apparatus at Gartloch Farm at a cost of £277, and to accept the tender of the Clyde Valley Electrical Power Co. for a supply of electricity to Brackenhirst Farm.

CABLE-LAYING.—In connection with anticipated load development in the Govan area during the winter of 1938-39 the Electricity Committee has decided that it is necessary to proceed with the provision of main transmission cables, together with ancillary cables, between Dalmarnock and Govan and Dalmarnock and Linthouse. The cost, with the necessary switchgear, is estimated at £77,966.

Ilford.—CHEAPER ELECTRICITY.—Mr. G. F. Gregory, borough electrical engineer and manager, informs us that the following reductions in charges have been adopted by the Electricity Committee: Two-part domestic running charge reduced from ½d. per kWh to three kWh for 1d. during the two summer quarters; under the all-in rate for lighting, heating and cooking purposes (including the supply and installation of a cooker) the minimum consumption is reduced from 360 kWh at 1d. to 300 kWh at 1d. per quarter; for power supplies over 300,000 kWh per quarter the new charge is 0.75d. per kWh; for charging electric vehicles the flat rate of 1d. per kWh is reduced to ¾d. per kWh, and there is now an alternative rate comprising a fixed primary charge, according to size of vehicle, plus ½d. per kWh.

India.—HYDRO-ELECTRIC PROJECTS IN MYSORE.—As the demand for electricity is rapidly increasing in Mysore, the Government is now actively engaged in examining various hydro-electric projects which can be exploited to augment the supply. Three schemes are now under consideration. The first is to increase the output at Sivasamudram, the second is the Shimsha valley scheme and the third the Gersoppa Falls scheme. Of these the Shimsha valley project is the most promising. A suitable site for the construction of a dam is available on the Shimsha River with an effective head of 620 ft. as against 400 ft. at Sivasamudram. A difficulty is that the natural flow of the river by itself is neither sufficient nor continuous, but it is proposed to overcome this by feeding the penstock lines from a forebay which would receive water from various sources. Consideration is being given to a suggestion that the Sivasamudram output should be gradually replaced by that from Shimsha until a point is reached when there will be no generation at Sivasamudram, Shimsha taking all the water now used there.

Korea.—HYDRO-ELECTRIC PROJECT.—A Japanese concern is reported to have applied to the Korean Government for a concession to establish a large hydro-electric power station with an eventual capacity of 200,000 kW on the Yalu River, near Shingishu, with the object of supplying power to industrial undertakings in North Korea.

Littleborough (Lancashire).—CONCESSIONS.—The Council has decided to reduce the domestic lighting flat rate from 4¾d. to 4½d. per kWh, with corresponding reductions down to 3½d. per kWh according to consumption. Reductions have also been made in the charges for electricity supplied to large power consumers. On July 1st a new tariff of 2d. per kWh for "after hours" shop-window lighting came into force.

London.—L.C.C.—An electrical installation at the Dempsey Street School, Mile End, is to be provided by the County Council. New fire-alarm systems are to be installed at the Battersea and Shadwell fire stations at a cost of £4,000.

POPLAR.—Mr. R. Illingworth, borough electrical engineer and general manager, reports that sales of energy during the year ended March 31st last showed an increase as compared with the previous year of 7,130,200 kWh, or 12.5 per cent., which constitutes a record for the undertaking. Revenue increased by £22,533, making a total of £311,786, with an average price per kWh sold of 1.187d. It should be pointed out, however, that the revenue includes all rentals and hire of apparatus, which if included in a separate rentals account would have the effect of reducing the average price to approxi-

Leeds Undertaking in 1936-7

MR. C. NELSON HEFFORD, general manager and city electrical engineer, reports that during the year ended March 31st last the simultaneous maximum load on the Whitehall Road and Kirkstall power stations, which were operated in parallel on the three-shift system throughout the period, was 110,140 kW against 103,200 kW in the previous year. At Whitehall Road 106.2 million kWh was generated with a coal consumption of 2.227 lb. per kWh, while the output of Kirkstall was 270.7 million kWh with a coal consumption of 1.345 lb. per kWh. The cost of coal per kWh generated at Whitehall Road was 0.147d. and at Kirkstall 0.089d. Sales during the year were estimated at 330.7 million kWh on which the working expenses per kWh were 0.336d. against 0.345d. in the previous year, despite an increase in the cost of coal from 0.126d. to 0.134d. Total cost of production is given as 0.645d. (against 0.682d.) per kWh sold, in addition to which capital expenditure contributions work out at 0.037d. (0.035d). Excluding bulk supplies to the Central Electricity Board and to other undertakings, sales are put at 244.6 million kWh, an increase of 7 per cent. as compared with the previous year. There was considerable expansion in residential bulk supplies. The number of consumers adopting this method of payment increased from 43,642 to 54,900 (26 per cent.) and the capacity of their apparatus from 149,365 to 178,196 kW (19 per cent.). Consumption increased from 44.8 to 49.5 million kWh (10 per cent.). The popularity of the assisted wiring scheme has been maintained, the number of consumers connected at March 31st being 57,122, while applicants awaiting connection numbered 219. Although the total expenditure amounts to £324,560 the debt outstanding is only £58,155. The number of consumers for power and bulk supply rose from 5,067 to 5,204 and the total capacity of motors connected from 127,186 to 131,196 kW. Sales increased by 9 per cent. to nearly 105 million kWh, equivalent to 813 kWh per kW installed against 785 kWh in the previous year. For lighting purposes only, consumers decreased in number from 85,165 to 80,519, but the capacity of their installations was slightly more (60,527 kW against 60,490 kW). Sales for private lighting rose by 6 per cent. to 32.8 million kWh and for street lighting similarly to 1.2 million kWh. The whole of the requirements of the tramways undertaking are now taken from the Electricity Department, and supplies for traction, at the low price of 0.367d. per kWh, increased by 3 per cent. to 39.7 million kWh. Mains laid during the year aggregated 106 miles, bringing the total to 2,728 miles, while sub-stations and kiosks were increased by 14 to 409. Total revenue (estimated) was £1,020,448 (against £961,258) and working expenses £463,863 (£424,145), leaving a gross surplus of £556,585 (£537,113). After deducting various charges, including £244,018 for the reduction of the loan debt, the net profit was £112,411 (£106,124), of which £49,955 has been absorbed as a contribution to capital expenditure.

mately 1.139d. Reference to the graphs in the engineer's report shows that the total number of cookers installed at March 31st was 6,286, and in addition there were on circuit 1,839 wash boilers and 1,020 water heaters. Since March 31st applications have averaged fifty-one cookers, twenty-one wash boilers and thirty-one water heaters per week, indicating that the progress of last year is being maintained. For cookers, water heaters and wash boilers both kWh supplied and revenue obtained were more than doubled, the average price obtained being 0.865d. per kWh. Everything indicates that the current year will be a record one, and although Mr. Illingworth does not expect that 10,000 cookers will have been connected by March 31st next, he anticipates that this will be achieved not long afterwards.

Sanction has been obtained to a loan of £25,000 for consumers' electrical apparatus and £1,000 for a meter department at the new town hall.

ST. PANCRAS.—The Daily Sketch and Sunday Graphic, Ltd., is increasing the plant at its works, which will double the present demand for electricity. It is therefore necessary to provide an additional feeder from the Tavistock Place sub-station to the works, and the Electricity Committee proposes to utilise an existing feeder in the southern area of the borough, which, owing to the change-over to a.c., is no longer necessary for its original purpose, and to extend this old feeder to its required length by the use of cables of suitable section recovered by the removal of an unused d.c. feeder between the power station and Camden Road. By this means cables which would otherwise have only a scrap value will be economically utilised, and will serve to keep the estimated expenditure for the required feeder to the minimum of £2,488. The additional revenue to be derived from the increased demand is estimated at £2,400 per annum.

Sanction has been received from the Electricity Commissioners to a loan of £11,278 for sub-station equipment and building work.

The present lighting in Swain's Lane is by nineteen gas lamps. To suitably illuminate this thoroughfare by electricity it is proposed to install thirty-five lighting points fitted with 100-W lamps. Although the illumination afforded under the proposed scheme will represent an increase of 127 per cent., the cost for electricity will be £17 per annum less than the sum at present paid for gas. It is further proposed to improve the lighting in Calthorpe Street by the installation of 125-W electric-discharge lamps.

An a.c. distributor is to be laid from the power station to Camden Road at a cost of £1,182, and £4,000 is to be spent on laying a.c. mains in the same road.

FULHAM.—Sanction has been obtained to a loan of £1,682 for two additional water feed pumps, including driving motors, at the power station.

The consulting engineers have informed the Electricity Committee that the method originally adopted of building the walls of the flue gas reheating chambers, in connection with the sulphur extraction plant, with an inner section of special acid-resisting brickwork separated from the outer brick wall by a ½ in. thickness of asphalt has not proved satisfactory in practice, the asphalt having run, causing the walls to bulge. As an experiment, the wall of one of the chambers was rebuilt with a lining of "Keralith" acid-resisting mortar, instead of asphalt, and as this has been entirely satisfactory, the engineers have advised that all the reheating chambers should be treated similarly, the estimated cost being £4,000.

Manchester.—REDUCED CHARGES.—The Electricity Committee has decided to reduce its charges as from July 1st. The reductions, which will absorb something like £58,000 of revenue, might have been greater if the price of coal had not so risen that the power stations this year will have an increased expenditure of £70,000. The services affected by the concessions include lighting, domestic power and heat, small industrial power supplies, cooking and heating on business premises and hiring.

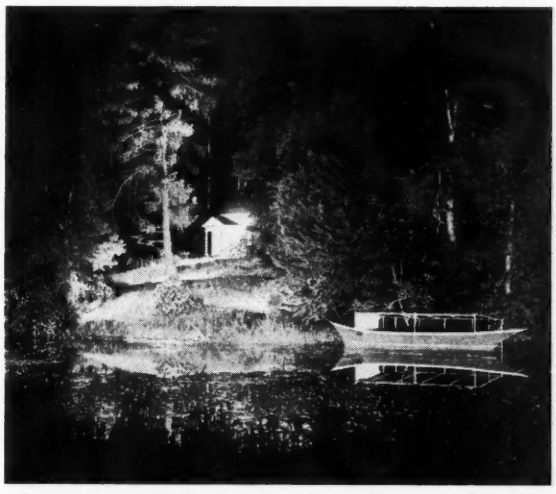
Nantwich.—PROTEST AGAINST "INEQUITABLE CHARGES."—Parish Councils in the Nantwich district have held a meeting and passed a resolution to be submitted to the Parliamentary Committee of the Cheshire County Council stating that in view of "the unfair and inequitable" system of residential charges operated by the Electricity Distribution of North Wales and District, Ltd., representations should be made to the distribution authority, and, if necessary, to the Minister of Transport, with a view to a more equitable system of charges being introduced, preferably proportionately upon the rateable value of the residential premises, plus a nominal "unit" charge in respect of electrical energy consumed.

New Zealand.—HUTT VALLEY BOARD'S REPORT.—The report of Mr. E. F. Hollands, engineer, general manager and treasurer of the Hutt Valley Electric Power Board, for the year ended March 31st last shows that sales of energy increased by 14 per cent. to 24.8 million kWh. At the end of March consumers numbered 12,823, against 12,251 a year before, the annual load factor being 56 (56.3) per cent. Cookers connected numbered 2,242 (2,068) and water heaters 2,012 (1,731). Revenue increased by £9,571 to £112,918 and working expenses by £4,673 to £74,292. The net profit was £15,384. During the last half of the financial year legislation came into force involving provisions as to the forty-hour week, compulsory unionism, minimum scale of wages and other matters affecting the staff.

Poole.—STREET-LIGHTING CONTRACT.—The Borough Council has accepted the tender of the Bournemouth and Poole Electricity Supply Co., Ltd., for electric lighting (in place of the existing gas lighting) along certain main roads in the borough.

Russia.—NEW HYDRO-ELECTRIC POWER STATIONS.—The *Monthly Review* of the U.S.S.R. Trade Delegation in Great Britain reports that more than twenty large hydro-electric stations are under construction in Soviet Russia at the present time. Two of them, the Rybinsk and Uglich stations, with a total capacity of about 430,000 kW, are being built on the Volga. The total capacity of the twenty new plants will be about two million kW. The majority of the stations are expected to be completed by the beginning of the third Five-Year Plan.

Scotland.—PROGRESS OF GRAMPIAN SCHEME.—The third stage of the Grampian Hydro-electric Scheme was completed on June 26th, when the last shot was fired in a tunnel five miles long linking Loch Garry and Loch Ericht. The waters of Loch Garry will flow through the tunnel to Loch Ericht, which is used as a reservoir for power stations at the west end of Loch Rannoch and at Loch Tummel. The estimated cost of the tunnel is £250,000. Mr. George Balfour, M.P., of Messrs. Balfour, Beatty & Co., engineers and contractors, who have carried out the scheme for the Grampian Electricity Supply Co., pressed the button to fire the final shot. Thus the remaining rock was removed and the tunnel through the mountain was completed.



Floodlighting carried out by the Reigate Electrical Co. at Broome Park, Betchworth, Surrey, for the recent Water Pageant held there in aid of the Royal Free Hospital

SUPPLY TO INDUSTRIAL ESTATE.—Scottish Industrial Estates, Ltd., has reached an agreement with the Clyde Valley Electrical Power Co. regarding the construction of main feeder lines across the Clyde to a sub-station on the estate, near Glasgow, on which factories are being erected. From this sub-station there will be circuits to different parts of the estate as they are required.

South Africa.—CAPE TOWN.—Seaweed and sand swept by a recent north-west gale into the pumps of the power-station

Distribution Proposals Further Discussed

DURING the annual conference of the Urban District Councils Association at Ilfracombe last week opposition was expressed to the Ministry of Transport's proposals for the reorganisation of electricity distribution. Mr. E. C. King (Purley) complained that the Association was not allowed a brief of the evidence submitted to the McGowan Committee, and was prejudiced from the outset because it was not informed of any allegations that might have been made against local authorities before the Association itself gave evidence. On the motion of Mr. W. H. Harris (Walton and Weybridge) it was decided to add to the resolution of protest an instruction that the Executive Committee should press for the deletion of the clause authorising the Electricity Commissioners to give preference to amalgamation under basis A.

At a conference of South Wales local authorities held last week in Cardiff it was decided to put up a united fight against the recommendations in an effort to preserve municipal control of electricity supplies. Representatives of fifty-two authorities in the area passed a resolution recommending the larger authorities in South Wales and Monmouthshire carefully to consider any representations of the smaller authorities with a view to maintaining and extending municipal control.

Hampstead Borough Council, which is in the unique position of having no debt on its electricity undertaking, considers that the basis of the payment of the outstanding debt as a purchase price is manifestly inequitable, and that amalgamation should not be contemplated unless its advantages are proved. The safeguard in the memorandum that there should be no increase in the average prices charged to consumers of particular classes in an amalgamated area is not regarded as satisfactory.

cooling plant made it necessary to reduce the output of the station by half. The suburban electric train services had to be curtailed.

Southgate.—RE-TRANSFER OF ELECTRICITY UNDERTAKING.—The Borough Council at its meeting on June 22nd resolved by twenty-one votes to one to adopt the unanimous recommendation of its Electricity Committee that notice should be served upon the North Metropolitan Electric Power Supply Co. requiring the company to re-transfer the Southgate electricity undertaking to the Council on August 2nd, 1938. Councillor Crane, the chairman of the Committee, said that during the fourteen years since the Council's last option of requiring the re-transfer the Northmet Co. had paid £5,000 per annum to the Council as a consideration for not having exercised that option. Considering the importance of the matter there was very little discussion. Councillor Crane hoped that the Council would have sufficient confidence to vote without the necessity for going into voluminous details. All of the documents were open to their inspection. The recommendation was seconded by Councillor A. E. Lauder, who, as former town clerk, is described in the local Press as mainly responsible for obtaining the financial concession from the Northmet fourteen years ago. One alderman objected to the matter being sprung upon them so suddenly, and another drew from Councillor Lauder a remark intimating that if the recommendation were not passed they would get no further annual payments from the Northmet. A councillor who wanted to know if there were technical difficulties in the way of the Council assuming responsibility for its own undertaking did not press his point after Councillor Crane had stressed the undesirability of saying much at the present juncture, "especially as there was one of the officials of the Northmet actually present in the Council Chamber."

ELECTRICITY CHOSEN FOR ESTATE.—After considering the relative merits of gas and electricity the Borough Council recently decided to have its new housing estate wired for electricity. An amendment that provision should also be made for gas was defeated.

Stockton-on-Tees.—SUB-STATION.—A sub-station is to be built in Brougham Street by the Town Council at a cost of 1,250.

Stoke-on-Trent.—BY-PASS LIGHTING.—It is proposed to adopt central lighting by electricity for the Harpfield by-pass, the lamps to be 100 yd. apart.

LOANS.—The Electricity Committee is to borrow £1,500 for a supply to 149 new houses at Porthill, £2,000 for mains at London Road Stoke, £2,200 for a supply to Brindley Ford, and £50,000 for consumers' wiring installations. It is seeking sanction to borrow £20,000 for general change-overs.

Traction

Glasgow.—TRAM LIGHTING.—The General Electric Co., Ltd., has carried out the whole of the lighting in one of the new trams which are being put into service. Specially designed fittings have been installed so as to provide an even distribution of high intensity lighting with low intrinsic brilliance. They incorporate flashed opal glassware with etched decorative lines which have the effect of removing flatness of lighting without irritating glare. The fittings in the lower saloon consist of a continuous length of stepped opal glassware and incorporate a ventilating shaft, so that they serve the dual purpose of lighting and ventilation. At each end and in the centre of the car provision is made for the intake and expulsion of air.

Leeds.—INCREASED PROFIT.—During the year ended March 31st last nearly 186 million passenger-journeys were made on the Transport Department's trams and buses, as compared with 180¼ million in the previous year, reports Mr. W. Vane Morland, the general manager and chief engineer. Total receipts amounted to £1,194,710, against £1,152,122. The net surplus was £29,804, as compared with £24,164, apart from which £24,713 has been contributed from revenue to capital expenditure.

Manchester.—TRANSPORT DEPARTMENT'S OPERATIONS.—The tramways, which the Transport Committee proposes completely to abandon, last year dealt with more than half the total traffic—196 million of the 346 million passenger-journeys. There was, however, a decrease of £30,998 in the tramway receipts, of which £25,510 was due to reduced receipts from existing tram services and the remainder to conversion of routes to bus operation. The total income from the tramways was £1,162,663 (against £1,193,661 in 1935-36) and from the buses £1,132,302 (£1,058,253). Energy was purchased from the Electricity Department at a reduced rate (0.739d., against 0.802d. per kWh) and the total expenses per car-mile were 15.727d. (15.881d.), car-miles run numbering 17,820,733 (17,832,180). The gross profit from the tramways was £179,532 and from the buses £219,019, the respective net profits being £6,064 and £84,411. In the capital account there is set down £27,132 for line equipment, Rochdale Road Garage, and promotion expenses under the heading of "Trolley-buses." Contracts were placed during the year for the supply of forty-three of these vehicles, costing £98,559. The general manager of the Corporation Transport Department is Mr. R. Stuart Pilcher.

Northern Ireland.—BELFAST.—Increased traffic revenue from trams and buses, but decreased working profits owing to heavier expenditure, are shown in the annual report of the Belfast Tramways Committee for the year ending March 31st last. In the tramways section revenue amounted to £595,535, as compared with £594,370 for the previous year. Total revenue rose by £3,373 to £604,640 and working expenses by £5,328 to £433,797, the working profit being £155,191 (against £160,565). After providing for various charges the operation of the tramway section showed a surplus of £29,703. The miles run during the year were 9,795,914, an increase of 272,376, and the number of passenger-journeys was 117 millions, an increase of 714,000.

Russia.—MOSCOW UNDERGROUND RAILWAY.—In its second year of operation, to May 15th last, the Moscow underground railway transported 128 million passengers, as compared with 77 million during the previous year. Twenty trains per hour are now being run, as against fifteen during the first year. What is claimed to be the world's biggest escalator is to be installed on the second line of the railway, which is now under construction, states *Reuter*. The escalator is to serve the Dynamo Stadium station. It will carry passengers up a height of 130 ft. and will have a total length of 210 yd. Altogether, twenty-seven escalators will be installed at the various stations on the new line.

Communications

Chile.—RADIO LINK WITH EASTER ISLAND.—A *Reuter* message from Santiago states that Easter Island, the remotest part of Chilean territory, has been linked with the mainland by means of a powerful radio station, and the authorities on the island have already communicated with Antofagasta and other stations. In the past Easter Island, which is leased to a Scottish firm for cattle raising, has relied on the yearly visit of a steamer chartered by the firm for its contact with the outside world. It is also occasionally visited by Chilean warships.

Great Britain.—RADIO RELAY.—As announced in the House of Commons on June 7th, the Post Office has set up a department to investigate and report on technical research and practical and experimental work in connection with the distribution of broadcast programmes by wire in order that a decision can be made concerning the future development of wired broadcasting. The appointment is now announced of Mr. T. Walmsley, Ph.D., I.Inst.C.E., A.M.I.E.E., M.I.R.E., as staff engineer for study and control of the line distribution broadcast systems.

RADIO FOR HOSPITALS.—A special sub-committee of Glasgow Corporation has agreed that radio receiving apparatus shall be installed in the fever and general hospitals and sanatoria at a total approximate cost of £9,000.

TRANSATLANTIC TELEPHONE CHARGES.—Reductions in the charges for telephone calls to Canada (beyond the Montreal zone) and the United States (beyond the New York zone) were announced by the Postmaster-General last week. The new charges, which came into force yesterday, range from £1 to £1 8s. instead of from £1 8s. to £2 for three-minute calls.

PROFIT FROM HULL TELEPHONES.—The operation of the Hull municipal telephone system during the past year resulted in a profit of £27,231 after £13,540 had been paid in royalties to the Postmaster-General.

SUBMARINE TELEPHONE CABLES.—The laying of two new submarine telephone cables between Aldeburgh, Suffolk, and Domburg, Holland, has recently been completed by Submarine Cables, Ltd.

LONG-DISTANCE TELEVISION.—For the first time the entire television programme from Alexandra Palace was received on Monday at Coventry, 83 miles away, more than three times the official reception range. This is by far the greatest distance, so far, at which television has ever been received satisfactorily. The programme was received by the G.E.C. works at Coventry, and the set was a standard G.E.C. receiver with some small modifications, including the use of a different type of high-efficiency valve. A standard aerial assembly was used.

Iceland.—TELEPHONE TIME-INDICATOR.—Reykjavik has followed the example of London, Warsaw, Oslo and other towns in ordering an L.M. Ericsson automatic telephone time-indicator.

United States.—ITALY AND RADIO-TELEGRAPH TRAFFIC.—A contract designed to give Italy partial control of radio-telegraphic communications between America and the Balkans and Near East, the majority of which now passes through England and France, was revealed at a hearing before the Federal Communications Commission at Washington last week. The Mackay Radio Corporation applied to the Commission for a permit to operate a direct radio circuit between the United States and Rome, and presented a contract already signed with Italo Radio, the Italian Government-owned radio company, which provides that the Mackay Corporation should transmit all telegrams addressed to Egypt, Palestine, Syria, Albania, Bulgaria, Greece, Rumania, Turkey and Yugoslavia through Rome, as well as traffic addressed to Italy. The contract becomes effective if and when the permit for a direct radio circuit to Rome is granted by the Federal Communications Commission. Counsel for Western Union Radio Corporation of America opposed the granting of such a permit, claiming that, among other things, it would establish a European communications network for Italy at the expense of England and France. Italy's present share in American-European communications traffic was given as 4.3 per cent., France's as 15 per cent., and England's as 48.5 per cent.—*Reuter*.

Contract Information

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Contracts Open

Australia.—SYDNEY.—July 29th. County Council. One 100-ton electrically operated travelling crane at Bunnerong power station. (T.Y. 24347/37.)*

MELBOURNE.—August 10th. State Electricity Commission of Victoria. One experimental high-capacity self-cleaning disc screen, in accordance with Spec. No. 37/55. Agent-General for Victoria, Melbourne Place, London, W.C.2.

Barking.—July 16th. Borough Council. Electrical installation work in connection with a new Fire Brigade headquarters in Alfred's Way. (See this issue.)

Birmingham.—July 19th. Watch Committee. Electric lighting and power supply and one electric passenger bed lift at the new Pathological Block, Mortuary, Newton Street; and electric lighting and power supply at the new Digbeth Police Station. H. J. Manzoni, city engineer, Council House (deposit £2 in each case).

Brighton.—July 5th. Corporation. Boiler plant instrument and control panels for Southwick power station. (June 18th.)

Bury.—July 19th. Electricity Committee. Twelve months' supply of p.i. l.c. cables. (See this issue.)

Cardiff.—July 13th. R.D.C. Electricity Department. Two 11-kV automatic circuit-breakers and one 200-kVA transformer. (See this issue.)

Chelmsford.—July 12th. Borough Council. Rewiring of electrical installation at the Trinity Road school. V. J. Willis, borough engineer, Municipal Offices (deposit £2 2s.).

Gainsborough.—July 9th. U.D.C. Electrically driven centrifugal borehole pumping plant capable of raising up to 50,000 gal. per hr. from a depth of 400 ft. to the reservoirs about 180 ft. above the pumphouse level. W. Vaux Graham, 5, Queen Anne's Gate, London, S.W.1 (deposit £5).

Halifax.—July 14th. Town Council. Electric lighting at Warley Road, Caddy Field and Salterlee schools. D. T. Lloyd Jones, borough engineer, Crossley Street (deposit £1 1s.).

Hawarden.—July 7th. Electricity Department. H.v. and l.v. overhead line and cable, pole transformer sub-station, and one 11-kV pole-mounted switch. (June 18th.)

Heston and Isleworth.—July 7th. Borough Council. Electric lighting and power installation at the proposed public swimming bath, Isleworth. (June 25th.)

Irish Free State.—DUBLIN.—July 26th. Electricity Supply Board. One 25,000-kVA transformer with on-load tap-changing equipment. (June 18th.)

Diesel alternator set for Pigeon House generating station. (June 25th.)

Leeds.—July 12th. Housing Committee. Wiring of houses on various estates. A. H. Linnett, housing director, 26, Great George Street (deposit £2).

Liverpool.—July 6th. Corporation. Meter testing equipment. City lighting engineer, 17, Highfield Street.

July 12th. One steam generating set and alterations and additions to switchboard at Smithdown Road Hospital. Land steward and surveyor, Municipal Buildings.

London.—WEST HAM.—July 12th. Twelve months' supply of coal. (June 25th.)

ST. PANCRAS.—July 8th. Meter boards, cookers, fires, washboilers and water heaters for one year. (June 18th.)

COMMISSIONERS OF H.M. WORKS.—July 9th. Rewiring I.R.O., 17, North Audley Street, W.1. (June 25th.)

FULHAM.—July 21st. Borough Council. House telephone, fire alarm and call sign systems at the power station, Townmead Road. (See this issue.)

Manchester.—July 5th. Electricity Committee. 6.6-kV, 3-phase, a.c. switchgear. (June 18th.)

July 9th. Supply and lagging of a main gas duct for two boilers at the Stuart Street power station. (June 25th.)

Middlesbrough.—July 12th. Corporation. Twelve months' supply of cables. (See this issue.)

Newcastle-upon-Tyne.—July 5th. Trade and Commerce Committee. Three electric capstans and eleven dollies. City engineer, Town Hall.

Newton-in-Makerfield.—July 10th. U.D.C. Electricity Department. One 400-kVA transformer. (June 25th.)

New Zealand.—WELLINGTON.—October 5th. Public Works Department. 20,000-kVA transformer bank. (T.Y. 24415/37.)*

Peterborough.—July 9th. City Council. Electrically driven circulating pump in connection with the installation of a new heating scheme at the Public Library. City Engineer's Office, Town Hall.

Prudhoe-on-Tyne.—U.D.C. Electric wiring of sixty-eight houses. B. Preston, surveyor, Council Offices.

Sheffield.—July 3rd. Town Council. Wiring and fittings at seven schools. W. G. Davies, city architect, Town Hall (deposit £2).

July 13th. Electricity Committee. One 13-panel board for 33-kV switchgear. (June 25th.)

South Africa.—JOHANNESBURG.—August 3rd. Railways and Harbours Administration. One 3-ton and eight 5-ton overhead electric travelling cranes. (T.Y. 24344/37.)* Two 7-ton and two 150-ton overhead electric travelling cranes. (T.Y. 24343/37.)*

July 17th. City Council. Stationary battery and equipment. (T.Y. 24345/37.)* One bank of 3,000-kVA transformers. (T.Y. 24269/37.)*

July 24th. House service type electricity meters. (T.Y. 24641/37.)*

August 14th. Three 6,000-kVA transformers, with associated equipment, for the Forest Town sub-station. (T. 24644/37.)*

PORT ELIZABETH.—July 22nd. City Electrical Engineer's Department. Transformers, cables, switchgear, meters, &c. (T. 24623/37.)*

PRETORIA.—July 22nd. Public Works Department. Low temperature heating panels and thermostats. (T. 24034/37.)*

June 30th. Union Tender and Supplies Board. Line material. (T. 24533/37.)*

August 6th. H.v. and l.v. switchgear and one 25-kVA transformer. (T.Y. 24649/37.)*

SOMERSET EAST.—July 28th. Municipal Council. Switchgear, meters, transformers, transmission line material, &c., in connection with extensions to the electricity scheme. (T. 24074/37.)*

Southend.—July 12th. Town Council. Electrically driven pumping installation comprising two sewage pumps (500-gal. per min. each) and two storm water pumps (3,500-gal. per min. each), with electric motors, switchgear, &c. J. D. & D. M. Watson, 3, Central Buildings, Westminster, London, S.W.1 (deposit £3 3s.).

Stanhope (Co. DURHAM).—Parish Council. Overhead electric network for lighting extensions at Ireshopeburn. E. C. Lennox, Carliol House, Newcastle-upon-Tyne.

Stockport.—July 12th. Public Assistance Committee. Invisible panel heating and electric lighting and power installations in connection with the erection of new maternity wards at the Stepping Hill Hospital. H. Barlow, clerk to the Committee, Public Assistance Offices (deposit £5 in each case).

Wallasey.—July 13th. Borough Council. Water pumping machinery, cast-iron connections, electric motor (about 167 h.p.), automatic control equipment and cables. Borough gas and water engineer, The Gasworks.

Warrington.—July 13th. Health Committee. Electric lighting, heating, power, clocks, signalling, fire alarms, radio and telephones at the Borough General Hospital. (See this issue.)

Wolverhampton.—July 5th. Transport Department. Traction poles. General manager, Corporation Transport Department, Cleveland Road.

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* Further particulars from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Contracts Closed

Aberdeen.—Education Committee. Accepted. Electrical work at reconstruction and enlargement of the High School for Girls (£646).—J. F. Anderson, Ltd.

Glasgow.—Electricity Committee. Messrs. Bruce Peebles & Co., Ltd., inform us that in addition to the transformers mentioned in the note in our last issue they supplied twelve 400-kVA transformers.

Committee on Printing. Accepted. Electric service lift at printing works (£250).—Glasgow Engineers, Ltd.

Lighting Committee. Accepted. Reflector fittings.—Falk, Stadelmann & Co.

Goole.—Town Council. Accepted. Electrical work in connection with 100 houses and twelve flats at Mount Pleasant, forty-one houses at Potter Grange, and thirty-nine houses and eight flats at Morley Street (£844).—Temple & Co.

Hull.—Education Committee. Accepted. Electrical installation at Albion Street Instruction Centre (£311).—A. Lee.

London.—L.C.C.—Housing and Public Health Committee. Electric lighting, &c., in 746 existing houses and flats, &c., at Becontree (Dagenham area—No. 13 contract):

	£		£
Hollitay & Son (Electrical), Ltd. Accepted	**7,054**	Springvale Electrical Co. ...	7,698
Ryland's Electrical Co.	7,090	Jacob, White & Co.	7,786
Newman and Watson	7,137	G. E. Taylor & Co.	7,838
City Electrical Co.	7,593	W. H. Gaze & Sons	7,927
Read and Partners	7,602	Ellis and Ward	7,931
Pinching and Walton	7,605	Ilford Electrical Co.	8,111
Evans and Shea	7,618	Alexander Hawkins & Sons ...	9,374
Samuel Reed & Sons	7,680	Bective Electrical Co.	9,655
Electrical Installations	7,689	The chief engineer's comparable estimate was £7,067.	

Three electric bed lifts at the Maudsley Hospital extension (second section):

	£		£
Gimson and Co. (Leicester) ...	*2,514	W. Wadsworth and Sons ...	3,028
Evans Lifts, Ltd. Accepted ...	**2,635**	Pickerings, Ltd.	3,040
Etchells, Congdon and Muir ...	2,770	J. and E. Hall	3,475
Marryat and Scott	2,869	Express Lift Co.	3,544
Bennie Lifts	2,981	Waygood Otis, Ltd.	3,795

* Qualified.

Wiring and fittings for electric lighting and supplementary heating at Smeed Road school (Bow and Bromley):

	£		£
Burdette and Co. Accepted ...	**746**	Springvale Electrical Co. ...	1,039
Ilford Electrical Co.	916	City Electrical Co.	1,139
A. Hawkins and Sons	965	Buchanan and Curwen	1,211
Collins Electrical, Ltd.	1,024	J. E. Swann and Co.	1,327
Archibald Meckhonik	1,035		

ST. PANCRAS.—Contracts and Stores Committee. Recommended. Five 400-V 3-phase a.c. motors, including slide rails and starters (£166).—Veritys, Ltd. Additional h.v. switchgear at the Arlington Road sub-station (£826) and electrical operating equipment consisting of solenoid gear to be fitted to the five hand-operated feeder switches in the above station (£621).—G.E.C. Two 1,500-A meters in connection with a supply of electricity to premises in Gray's Inn Road.—Aron Electricity Meter, Ltd. One 2-panel l.v., d.c. switchboard and two ebony Sindanyo panels to accommodate the above meters (£96).—J. G. Statter & Co.

Accepted. Replacing d.c. motors by plant suitable for a.c. in the premises of T. L. Jacey & National Printing Co. (£105).—Higgs Motors, Ltd.

FULHAM.—Electricity and Lighting Committee. Recommended. Motor-driven water pump (£127).—Mather & Platt. Alarms for eight air-blast cooled transformers at the power station (£372).—James Howden & Co. L.v. distribution switchboards, comprising twelve transformer panels and forty-four distributor panels:

	£		£
W. Lucy & Co. Recommended ...	718	Met.-Vick. Elecl. Co.	1,570
Johnson & Phillips	868	Crompton Parkinson	1,890
English Electric Co.	957		

Two 200-kVA naturally air-cooled transformers (£351).—British Electric Transformer Co.

POPLAR.—Contracts Committee. Accepted. Switchgear for Glaucus Street station (£43,109).—Ferguson, Pailin. Two reactors (£770).—B.T.H.

STEPNEY.—Electricity Supply Committee. Recommended. Supplies during the period ending June 30th, 1938: Lampholders (£120).—Wholesale Fittings Co. Ceiling roses (£136).—Falk, Stadelmann & Co. Joint boxes (£302).—W. White & Co.

5-A switch-fuses:

	£		£
Sloan Electrical Co.	171	Foster Engineering Co.	243
	198	Wilec, Ltd.	243
Wholesale Fittings Co. Recommended	184	Revo Electric Co.	252
		J. A. Crabtree & Co.	288
Sun Electrical Co.	189	General Electric Co.	288
P. L. Dwyer & Co.	198	Falk, Stadelmann & Co.... ...	324
W. White & Co.	207	J. H. Tucker & Co.	412

Lampshades:

	£		£
P. L. Dwyer & Co.	281	Wholesale Fittings Co.	374
Eca-Ray Sales, Ltd.	288	W. White & Co.	452
	372	Sloan Electrical Co.	554
Falk, Stadelmann & Co. Recommended	351	General Electric Co.	558
	387		

Conduits and fittings:

	Conduit. £	Fittings. £		Conduit. £	Fittings. £
Wholesale Fittings Co. Recommended	791	372	Sloan Electrical Co. ...	1,060	417
			Sun Electrical Co. ...	1,060	441
Falk, Stadelmann & Co....	803	365	Metallic Seamless Tube Co.	1,060	503
W. White & Co.	883	424	General Electric Co. ...	1,060	542
P. L. Dwyer & Co. ...	947	441	Walsall Conduits ...	1,413	455
Simplex Electric Co. ...	1,060	367			

Morecambe.—Electricity Committee. Accepted. Overhead lines.—Transmission Lines & Cables Construction Co.

Newcastle-upon-Tyne.—City Council. Accepted. Mercury-arc rectifier apparatus for the Welbeck Road sub-station (£3,098).—B.T.H. Cable in connection with a supply of electricity to the X-ray apparatus at the City Hospital for Infectious Diseases.—Falconar, Cross & Co.

Shipley.—Electricity Committee. Accepted. Two 250-kVA transformers (£170 each).—Foster Engineering Co.

Staffordshire.—Education Committee. Accepted. Electric lighting and power at the new Senior Boys and Senior Girls school, Rugeley (£955), and at the new Stafford Council school (£537).—W. Hampton. Alterations and improvements to the electrical installation at the Willenhall Central schools (£433).—France's Electric, Ltd.

Stroud.—R.D.C.. Accepted. Electric lighting at houses at Box Lane, Minchinhampton.—Stonehouse Electric Co.

Warrington.—Electricity Committee. Accepted. Transformers.—Electric Construction Co.

Notes

A Bomb-proof Emergency Power Station

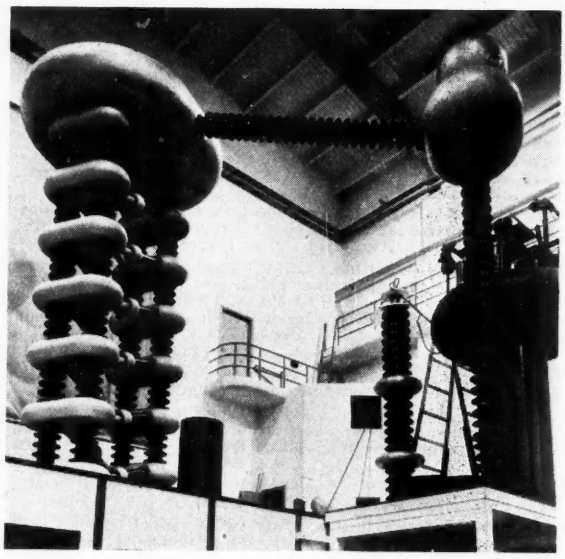
The Brown-Boveri Co., of Baden, Switzerland, has recently evolved designs for an emergency bomb-proof electric power station for which the company's "Velox" steam boiler, owing to the small amount of room it takes up, is claimed to be particularly suitable. The layout permits 20,000 kW of plant to be housed in a tunnel excavated in rock and having a section equal to that of a two-track railway tunnel. The plant would comprise a "Velox" steam generator capable of producing 80 tons of steam per hour, a steam turbine with its condenser, a 20,000-kW generator, all accessories and switchgear. There would also be two horizontal tanks at the far end of the tunnel for the storage of sufficient oil for the firing of the boilers to generate two million kWh. It is suggested that a bomb-proof station of this type could be built under arches constructed of massive ferro-concrete.

Television and Deafness

As a result of suggestions made to the General Electric Co. by those interested in the welfare of the deaf a series of practical tests with television is being carried out at the Tower House Home for Deaf and Dumb men, at Erith (run under the auspices of the Royal Association in Aid of the Deaf and Dumb). The programme was first shown to about thirty men, most of whom have been totally deaf from birth. In order that those conducting the experiment should share to some extent the reactions of the deaf people the sound was cut out and only the vision shown. The programme consisted of a fashion parade, a showing of Zoo animals, a news bulletin and a short play. Only the play appeared to suffer from the lack of sound, but it made little difference to the deaf men, who followed it intently and then burst into spontaneous applause at the end. Afterwards, through an interpreter, the men expressed the keenest delight and inquired whether they would be able to see important events, particularly football matches. All appreciated the possibility of having this source of news and entertainment continually available. Mr. D. A. C. Ellwood, superintendent of the home, said that a few men, although normally deaf, could hear something of the radio through earphones and amplifiers, although without differentiating between sounds, but for the great bulk of deaf people wireless had been quite useless. The tests are being continued in order to find, among other things, whether television still exercises an appeal after the novelty has worn off, and what type of programmes are most valuable to the deaf. A complete report will probably be sent to the B.B.C. with a view to suitable programmes being arranged.

Very High Voltage Generator

In the Cavendish Physical Laboratory of Cambridge University there has been installed a special generator for 1,250,000 V d.c. to earth. Outputs of this magnitude have been obtained for some years past from impulse generators, which deliver the high voltage for intervals which last only some millionths of a second. For purely physical observations a practically constant voltage is necessary. This can be obtained from the new Philips apparatus at 1,250,000 V with an output of 5 kW. The equipment operates on the cascade system and was ordered for experimental work in the field of atom splitting initiated in 1919 by Lord Rutherford and extended in the same laboratory by Cockcroft and Walton.



Apparatus at the Cavendish laboratory for producing a very high voltage on a cascade system

Power from Sea Waves

It is reported from Naples that the Italian National Committee of Research has adopted a method of utilising waves breaking on the seashore for the generation of electrical energy, devised by Capt. Finocchi, and that a company known as the "Ondo-Motore" has been formed to exploit the invention. It is stated that plant will be shortly set up in Italian Somaliland.

Public Address Engineers

A syllabus has been prepared and it is proposed to hold examinations four times a year for the admission of associate members to the Institute of Public Address Engineers. In its efforts at standardisation the Institute is to determine the most satisfactory method of ascertaining the audio-frequency output of amplifiers, together with the harmonic content.

Appointments Vacant

Mains foreman for Bethnal Green Electricity Department.

Telegraph engineer for the Governments of the Straits Settlements and the F.M.S. Posts and Telegraphs Department.

Lecturer in electrical engineering at Armstrong College, Newcastle-upon-Tyne.

District engineer and meter reader and fixer for the Boston and District Electric Supply Co.

Cable jointer for the City of Salisbury, Rhodesia, Electricity Department.

Lecturer in the Electrical Engineering Department, Robert Gordon's Technical College, Aberdeen.

Assistant electrical inspector for the Middlesex C.C.

Three sales service engineers, showroom manager, three showroom assistants and a lady demonstrator for the Fulham Borough Council Electricity Department.

Electrician in the Appliance Department of the Worksop Electricity Department.

Outside canvassers (male) for Ilford Electricity Department.

Junior shift engineer for Bradford Electricity Department.

Assistant installation and meter superintendent for Barking Electricity Supply Department.

Engineering assistants for the Air Ministry.

(See our classified advertisements.)

Our Personal Column

Eiectrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

Mr. J. W. J. Townley, electrical engineer and manager of the West Ham Corporation electricity undertaking, has been elected president of the Associated Municipal Electrical Engineers (Great Britain, Isle of Man and Northern Ireland), for the year 1937-38, and **Mr. A. J. Hutchinson,** electrical engineer to the Farnworth Urban District Council, has been elected vice-president.

[*Elec. Rev. photo.*
Mr. J. A. B. Horsley

Mr. J. A. B. Horsley, H.M. Electrical Inspector of Mines, was elected president of the Association of Mining Electrical Engineers for the ensuing year at the conference held in Southport last week. He is a member of the Institution of Electrical Engineers and received the O.B.E. in 1930.

Mr. J. F. White, mains superintendent to the Fulham Electricity Department, is retiring next August on reaching the age of sixty-five. He has been in the service of the Council since 1901.

Viscount Falmouth, Comp.I.E.E., M.I.Mech.E., has joined the board of Venner Time Switches, Ltd. As our readers are aware, he is a past-president of the Electrical Development Association and of E.I.B.A., also a vice-chairman of the London and Home Counties Joint Electricity Authority. His business interests include the chairmanship of the National Gas and Oil Engine Co.

Mr. J. W. Logan, outside representative of the General Electric Co., Ltd. (Glasgow branch), has been selected by the Scottish Bowling Association as a member of the Scottish team to meet the representatives of England, Ireland and Wales in the international matches to be played at Llandrindod Wells, Wales, on July 14th, 15th and 16th.

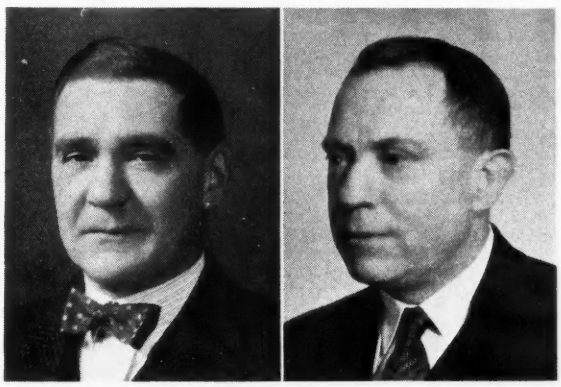
Sir Alexander Gibb, G.B.E., C.B., F.R.S., has been elected president of the London Chamber of Commerce in succession to Sir Stephen Demetriadi.

While attending the second Post Office Telephone and Telegraph Convention, held recently at Swanwick, fifty or so delegates motored over to Bakewell to inspect the works of the D.P. Battery Co., Ltd., who entertained them to tea. We reproduce a photograph taken on this occasion.

At the D.P. Battery Works during the visit arranged in connection with the P.O. Telecommunications Convention: Mr. H. G. Brown, the company's chief engineer; Mr. T. H. Boyd, Assistant Director-General, G.P.O.; Capt. B. S. Cohen, director of research, Post Office Research Station, Dollis Hill; and Mr. T. C. Elliott, the company's London manager

Mr. J. Beckett, who is retiring from the general secretaryship of the Municipal Tramways and Transport Association for reasons of health, was presented with an illuminated address and cheque by Sir John Timpson, past-president, on behalf of members, at the annual conference of the Association last week at Portsmouth. Mr. Beckett is being succeeded by **Mr. A. W. Chadwick,** assistant secretary of the Association.

Mr. G. H. Fletcher, M.I.E.E. chief engineer and manager of the Sheffield works of the Metropolitan-Vickers Electrical Co., Ltd., was elected chairman of the Comité Mixte at its meetings held in Paris on June 24th and 25th. The Comté Mixte is a joint committee of the International Electro-technical Commission, the International Union of Railways and the International Union of Tramways, with representatives of manufacturers of electric traction equipment. It was formed some years ago to formulate international rules concerning electric traction equipment. Mr. Fletcher is proceeding from Paris to Vienna to read a paper at the Congress of the International Union of Tramways, which he has written in collaboration with Mr. O. Silvers, general manager and engineer of the Wolverhampton Corporation Transport Department. The paper



[*Lafayette*
Messrs. G. H. Fletcher and A. G. Ellis

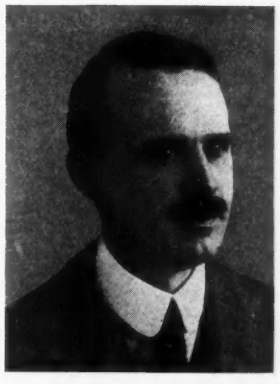
is entitled "Recent Developments in Trolley-bus Systems, Vehicles and Equipments in Great Britain." The meetings of the Congress in Vienna are being held from June 27th to July 3rd.

Mr. A. G. Ellis, chief engineer of the Transformer Department of the Metropolitan-Vickers Electrical Co., Ltd., was elected chairman of the Transformer Sectional Committee of the I.E.C., and presided over last week's meeting. This was the initial meeting of the Transformer Sectional Committee, which hitherto has been incorporated in the Committee for the Rating of Electrical Machinery, this committee having been now divided into two sections: (A) Rotating Machinery, and (B) Transformers. Mr. Ellis is chairman of the B.E.A.M.A. Transformer Technical Committee and is a member of the B.S.I. Transformer Committee, in which capacities he took an active part in the preparation of the revised Specification for power transformers, B.S.S.171, published last year.

Dr. P. Dunsheath, chief engineer, W. T. Henley's Telegraph Works Co., Ltd., has been appointed a director of the company.

Mr. B. W. Harding, of Bromley, has been recommended for the position of consumers' engineer in the Southwark Borough Council Electricity Department at a salary of £310 a year.

Mr. J. R. P. Lunn, electrical engineer and transport manager to Darlington Corporation, is to resign in three months' time for health reasons. Going to Darlington from Huddersfield Corporation in 1900 Mr. Lunn gave the town its first electricity supply a month later, the generating station having just been completed. The undertaking has been outstandingly successful under his management, and costs and charges have always been among the lowest in the country. Mr. Lunn was responsible for the electric tramways when they started in Darlington in 1904 and for the change-over to trolley-buses in 1926. When a successor is appointed he will fill the office of electrical engineer only, the Corporation having decided to appoint a separate transport manager.



[*Elliott & Fry*
Mr. J. R. P. Lunn

Mr. S. Brigg, distribution engineer of the West Hampshire Electricity Co., Ltd., has been appointed assistant mains engineer with the Croydon Corporation Electricity Department.

Alderman A. H. Gledhill, chairman of the Halifax Transport Committee, has been elected president, and **Mr. J. M. Calder** manager, of the Reading Transport Department, vice-president of the Municipal Tramways and Transport Association for the ensuing year.

To mark the occasion of his golden jubilee **Mr. Sydney Evershed,** of Evershed & Vignoles, Ltd., was on Wednesday presented by Mr. E. B. Vignoles, on behalf of subscribers, with a portrait painted by Mr. George Harcourt.

Aberdeen Electricity Committee recommends that an honorarium of £250 shall be given to **Mr. W. Hodson** for his services in acting as electrical engineer for the nine months during which the post was vacant.

Mr. J. N. Robertson, who has been assistant manager of the Wick Electricity Department almost since its establishment, has taken up a new post at Galashiels as consumers' engineer to the Scottish Southern Electric Supply Co., Ltd. Before his departure his colleagues presented him with a gold wrist-watch.

Mr. R. P. Sloan is joining the board of the Shropshire, Worcestershire and Staffordshire Electric Power Co.

Mr. G. O. McLean, personal assistant to the city electrical engineer, Hull, is resigning to take up a position as deputy manager and engineer at Ealing. **Mr. W. H. Dunkley,** Iron Acton, Glos, has been appointed to take his place at a salary of £750 per annum.

Basingstoke Town Council has increased the salary of the borough electrical engineer, **Mr. W. E. Jones,** from £650 to £700 per annum as from June 1st.

Mr. H. Cobden Turner has been elected chairman and **Capt. B. S. Cohen** vice-chairman of the Meter and Instrument Section of the I.E.E. for 1937-38. The chairman of the London Students' Section for the ensuing year is **Mr. N. C. Rolfe** and the vice-chairman **Mr. H. R. Walters.**

Obituary

Mr. Sydney Clark, district manager of the Boston and District Electric Supply Co., Ltd., for Holbeach, died on June 23rd at the age of twenty-eight.

Mr. T. Marshall.—The death recently occurred, at the age of sixty-six, of Mr. Thomas Marshall, founder of the firm of Thomas Marshall & Sons, electrical engineers, Derby.

Mr. G. Frederick Plutte died in London on June 24th at the age of fifty-nine. For over thirty years he was actively associated with the electric cable industry in this country and was well known for his work on cables all over the world. He was a director of Kabelwerk Rheydt A.-G., Rheydt, Düsseldorf, as well as managing director of Plutte, Scheele & Co., Ltd., and the Standard Cable Manufacturing Co., Ltd., both in London, and later managing director of the Enfield Cable Works, Ltd., from its formation in the year 1913 until his death. Among his other interests was the Enfield Rolling Mills, Ltd., of which he was the first managing director, retiring through ill-health a few months ago.

The late Mr. Frederick Plutte

Col. H. L. Cooper, the American engineer, who built the Dnieprostroy dam and power station for the Soviet Government, died on June 24th in Connecticut at the age of seventy-two. He had been engaged in hydraulic engineering for forty-six years.

Mr. W. Relph.—The death occurred on June 21st of Mr. William Relph, who was connected for some time with the Boston Smelting & Refining Co., Ltd., as consultant and travelling representative for the sale of the company's tungsten contacts.

Dr. H. H. Jeffcott.—We regret to record the death on June 29th of Dr. Henry Homan Jeffcott, secretary of the Institution of Civil Engineers.

Mr. J. F. Watson.—The death has occurred at Godsall Wood, Staffs, at the age of seventy-five, of Mr. James Falshaw Watson, a director of Joseph Sankey & Sons.

Mr. William Francis Brown, director of Ranton & Co., Ltd., died suddenly on June 20th at the age of forty-seven.

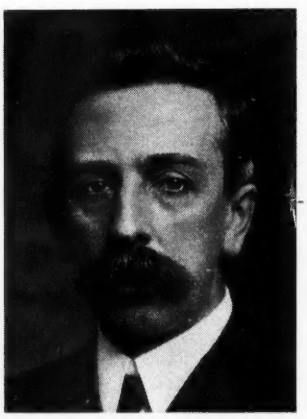
The Late Professor T. Mather

THE death on June 23rd of Thomas Mather, Emeritus Professor of Electrical Engineering, Imperial College of Science and Technology, must have brought back memories of their student days to thousands of electrical engineers at Home and overseas for his connection with the City and Guilds College extended over a period of about fifty-five years.

Thomas Mather was born at Higher Walton, near Preston, Lancs, in 1856 and was apprenticed to Thomas Whitaker & Sons, millwrights and engineers, Higher Walton, and Joseph Clayton & Sons, engineers and boiler makers, Preston. He attended science classes in Preston between 1875 and 1878; in the latter year he became First Whitworth Scholar and in 1881 First Royal Exhibitioner. At Owens College, Manchester, he studied chemistry, engineering, geology, mathematics and physics under men whose names were household words to science students of that generation—Roscoe, Osborne Reynolds, Boyd Dawkins, Barker and Balfour Stewart. He gained prizes in geology and physics, the Ashbury Engineering Scholarship and the Engineering Certificate, with honours, in Mathematics and Engineering.

He left Manchester to study chemistry and mathematics under Frankland and Goodeve at the Normal College of Science, South Kensington, and in 1882 was appointed assistant to Professor W. E. Ayrton, who was then conducting classes in some basement rooms pending the completion of the Finsbury Technical College. In 1885 he became Ayrton's assistant at the Central Institution, now the City and Guilds (Engineering) College of the Imperial College of Science and Technology, and upon Ayrton's death in 1908 he was appointed to his position.

He occupied this post for about fourteen years, retiring with the honour of Emeritus Professor in 1922, when he was succeeded by Professor C. L. Fortescue.



[Elliott & Fry

The late Professor Mather

Electrical Measurement

Mather was elected a fellow of the Physical Society in 1887 and attained to the coveted distinction of Fellow of the Royal Society in 1902. He joined the Institution of Electrical Engineers in 1890 as an associate, becoming an associate member in 1902 and member in 1908; he served as a member of Council and of various committees.

Throughout his career his special interest was electrical measurement. His first paper, read before the Physical Society in 1885, dealt with "Calibrating a Galvanometer with Constant Current" and a paper which he prepared on "The Shape of Movable Coils in Electric Measuring Instruments" (1890) formed the basis of the Ayrton-Mather narrow-coil galvanometer, leading the way also to the moving-coil oscillograph which was developed by W. du Bois Duddell in the Central Technical College laboratories. He also devoted special attention to field testers, shunts for galvanometers (the "Universal" shunt is associated with his name), electrostatic measuring instruments, non-inductive and anti-capacity resistances precision wattmeters (the Duddell-Mather type), and absolute measurements of electrical quantities to a high degree of accuracy; in association with Mr. F. E. (now Sir Frank) Smith, he determined the current and e.m.f. of the cadmium cell with the greatest precision attained at that date.

Writing at the time of his retirement in 1922 (when the accompanying portrait appeared) we said:—"On all these subjects Prof. Mather has indelibly impressed the mark of his originality and inventive genius; but greater by far than this is the success that he has attained by virtue of his enthusiasm, his inspiration, his unfailing common sense and his untiring industry united with a genial and patient disposition and modesty carried to a fault, in building for himself in the hearts of his pupils, colleagues and other friends a monument of admiration and affection more enduring than brass."

Two well-known electrical works stand to his credit—"Practical Electricity," written in collaboration with Ayrton, and "Exercises in Electrical Engineering," of which he was joint author with Professor G. W. O. Howe. He contributed a number of papers to the societies of which he was a member, and the ELECTRICAL REVIEW has published articles from his pen.

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Webster & Roblin, Ltd.—Private company. Registered June 24th. Objects: To acquire the business of an electrical engineer, &c., heretofore carried on by G. Webster at "Windrush," Bredhurst Road, Wigmore, Gillingham, Kent, and to carry on the business of electricians and general electrical engineers and contractors, radio, television, scientific and mechanical engineers, &c. The directors are: G. Webster (managing director), "Windrush," Bredhurst Road, Wigmore, Gillingham, Mrs. Sarah Daniel, "Kia Ora," Maidstone Road, Chatham, and J. Roblin, address not stated. Solicitors: Stigant, Son & Taylor, 22, High Street, Chatham.

Harking Electric Appliances, Ltd.—Private company. Registered June 24th. Capital, £1,000. Objects: To acquire the business of manufacturers, factors and retailers of electrical appliances carried on by S. E. Phillips and J. L. Lythall, at 147, Corporation Street, Birmingham. The directors are: S. E. Phillips, 6, Milford Road, Harborne, Birmingham, and J. L. Lythall, 4, Birdwell Court, Kings Heath, Birmingham. Registered office: County Chambers, 147, Corporation Street, Birmingham.

S.E.M. Developments, Ltd.—Private company. Registered June 24th. Nominal capital, £100. Objects: To carry on the business of manufacturers, repairers, sellers and letters on hire or hire purchase, exporters and importers of and dealers in every kind of electrical equipment, fitting, apparatus, machinery, cable, wire, plant, gear, &c. The first directors are: F. W. F. Hewitt, Trumps Green Cottage, Trumps Green, Virginia Water, Surrey, and three others. The directors' borrowing powers are restricted to an amount not exceeding twice the paid up share capital. Secretary: C. V. Waterhouse. Registered office: Eagle Works, Church Fields Road, Beckenham.

W. Andrew Bryce & Co., Ltd.—Private company. Registered June 26th. Capital, £2,000. Objects: To acquire the business of coil winders, electrical engineers, manufacturers and repairers of mains transformers, telephone, telegraph and electrical apparatus carried on by W. Andrew Bryce & Co. at North Road, Burnt Oak, Middlesex. The directors are: W. A. Bryce and Dorothy C. Bryce, both of 5, Lulworth Gardens, South Harrow, Middlesex. Registered office: 28, North Road, Burnt Oak.

British Electricon (London), Ltd.—Private company. Registered June 18th. Nominal capital £1,000. Objects: To carry on business as electrical and mechanical engineers and manufacturers of and dealers in dynamos, motors, armatures, batteries, lamps, reflectors, bells, fires, irons, cookers, &c. The subscribers are: V. E. Stevens and K. Fishman, of 17, Bedford Row, W.C.1. Solicitors: J. E. Lickfold & Sons, 17, Bedford Row, W.C.1.

Electrovibration, Ltd.—Private company. Registered June 17th. Capital, £100. Objects: To carry on the business of agents for and dealers in electrical apparatus, &c. The directors are: C. W. Thomas, 11, Priory Hill Avenue, Wembley; and O. G. Dannenberg, 61, Mount Ararat Road, Richmond, Surrey. Registered office: 9, Southampton Street, Bloomsbury, W.C.1.

Spark Battery, Ltd.—Private company. Registered June 16th. Capital, £100. Objects: To carry on the business of electricians, electrical and mechanical engineers, moulders, casters, rollers, welders and finishers, &c. The subscribers are: A. H. Collins, and C. H. Drage, both of Lloyds Building, E.C.3. Registered office: 231, Grand Buildings, Trafalgar Square, W.C.2.

Embassy Radio, Ltd.—Private company. Registered June 21st. Capital, £100. Objects: To carry on the business of manufacturers of and dealers in wireless and electrical goods, &c. The subscribers are: Mrs. M. M. Adler, 134, Delaware Mansions, W.9; and B. Adler, 134, Delaware Mansions, W.9. Mrs. M. M. Adler is the first director. Secretary: M. L. Halpern. Registered office: 19, Hanover Square, W.1.

H. J. Golding & Co., Ltd.—Private company. Registered June 22nd. Capital, £5,000. Objects: To carry on business as dealers in and manufacturers and repairers of artificial lighting apparatus, electrical, gas and oil lamps, electrical and wireless components, &c. The permanent directors are: H. J. Golding and Mrs. J. G. Golding, both of 32, Drybergh Road, Putney, S.W.15.

G. N. R. (Radio and Television), Ltd.—Private company. Registered June 18th. Capital, £500 in 6,000 founders' shares of 1s. and 200 ordinary shares of £1 each. Objects: To carry on the business of manufacturers of, wholesale and retail dealers in and agents for all classes of radio and television sets, apparatus, parts and accessories, electrical goods, &c. The directors are: Mrs. A. M. Roberts and N. R. Roberts, both of 3, Dartford Road, South Shields. Registered office: 54, Fowler Street, South Shields.

Stanley Carwin, Ltd.—Private company. Registered June 17th. Capital, £1,500. Objects: To acquire the business of an electrical contractor now carried on by S. Carwin at 47, Corporation Street, Preston. The permanent directors are: S. Carwin, 5, North Cliff Street, Preston; and Wm. Marland, Baldwin Croft, 36, Church Road, Leyland. Registered office: 47, Corporation Street, Preston.

Maxwell & Whitwam, Ltd.—Private company. Registered June 21st. Capital, £1,000. Objects: To carry on the business of electricians, mechanical engineers, founders, smiths, manufacturers and patentees of any mechanical or electrical device, goods or machinery, &c. The directors are: H. W. Maxwell, 1, Kenilworth Road, Ealing, W.5, and three others. Registered office: 92, Warwick Road, Ealing, W.5.

John Newth, Ltd.—Private company. Registered June 19th. Capital, £2,000. Objects: To carry on the business of electrical engineers, general electrical installation contractors, lighting specialists and contractors, &c. The directors are: J. Newth and Mrs. A. G. Newth, both of 10, Hare Lane, Gloucester.

H. M. T., Ltd.—Private company. Registered June 21st. Capital, £500. Objects: To carry on the business of electrical and general engineers and contractors, &c. The subscribers are: E. W. Hobbs, 2, Elm Park Court, Pinner, Mdx.; and C. H. Haswell, 59, Gracechurch Street, E.C.3. E. W. Hobbs is the first director.

Dann's Controlled Rays Syndicate, Ltd.—Private company. Registered June 22nd. Capital, £100. Objects: To carry on the business of manufacturers of and dealers in anti-dazzle scientific instruments and appliances for motor car headlamps, aircraft, aerodromes, film studios, street and allied lighting, &c. The directors are: W. C. Houghton, 83, Harcourt Terrace, S.W.10; and C. B. Dann, Rivermead, Thames Street, Sunbury-on-Thames.

Returns of Electrical Companies

Taylor's Radio Service, Ltd.—Capital, £500 in £1 shares. Return dated December 28th, 1936 (filed May 27th, 1937). 408 shares taken up. £408 paid. Mortgages and charges: £450.

Radioformer, Ltd.—Capital, £500 in £1 shares. Return dated December 14th, 1936 (filed June 4th, 1937). 200 shares taken up. £200 paid. Mortgages and charges: nil.

Cheadle Electric & Radio Co., Ltd.—Debenture, charged on the company's undertaking and property, including uncalled capital, dated June 3rd, 1937, to secure all moneys which the chargee may be called upon to pay to the District Bank, Ltd., under a guarantee not exceeding £500. Holder: A. G. Garson, Fairways, Cheadle, Staffs.

E. Marshall, Ltd.—Issue on June 1st, 1937, of £500 debentures, part of a series already registered.

R. Darbyshire, Ltd.—Equitable charge on benefit of certain hire purchase agreements dated June 7th, 1937, to secure all moneys due or to become due from the company to Martins Bank, Ltd., not exceeding £1,000.

Conradty Products, Ltd.—Issue on June 1st, 1937, of £500 debentures part of a series already registered.

D. Mandler & Co., Ltd.—Mortgage debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated June 5th, 1937, to secure £600. Holder: Mrs. E. V. Mandler, 2, Manville Road, Balham, S.W.17.

Pye Radio, Ltd.—The nominal capital has been increased by the addition of £135,000 beyond the registered capital of £200,000. The additional capital is divided into 2,704,000 deferred ordinary shares of 1s. each. 3,380,000 deferred ordinary shares of 1s. have been converted into deferred ordinary stock of 5s., 324,000 deferred ordinary shares of 1s. have been converted into 64,800 deferred ordinary shares of 5s., and the 150,000 participating preferred ordinary shares of £1 have been converted into participating preferred ordinary stock.

Rapid Electric Arc Welding & Metals Co., Ltd.—Capital, £500 in £1 shares. Return dated October 28th, 1936 (filed, May 14th, 1937). All shares taken up. £500 paid. Mortgages and charges, nil.

London & Provincial Electrical Co., Ltd.—H. K. Chittenden, of 60, Ashbrook Road, Highgate, N.19, was appointed receiver and manager on June 15th, 1937, under powers contained in debentures dated April 14th, 1937.

Midland Electric Manufacturing Co., Ltd.—Capital, £225,000 in 150,000 ordinary and 75,000 preference shares of £1. Return dated March 29th, 1937. 112,500 ordinary and 75,000 preference shares taken up. £85,000 paid on 25,000 preference and 60,000 ordinary shares. £102,500 considered as paid on 50,000 preference and 52,500 ordinary shares. Mortgages and charges, nil. A return of allotments made up to April 29th, 1937, shows a further 37,500 ordinary shares allotted as fully paid up.

Thames Valley Electric Supply Co., Ltd.—Capital, £150,000 in £1 shares. Return dated March 22nd, 1937. All shares taken up. £100,000 paid (£1 on 50,000 and 10s. on 100,000). Mortgages and charges, nil.

H. A. Lamb & Sons, Ltd.—Capital, £1,000 in £1 shares. Return dated June 5th, 1936 (filed May 11th, 1937). All shares taken up. £615 paid. £385 considered as paid. Mortgages and charges, nil.

Simpson, Baker & Co., Ltd.—Capital, £20,000 in £1 shares. Return dated April 7th, 1937. All shares taken up. £20,000 paid. Mortgages and charges, nil.

British Belmont Radio, Ltd.—The nominal capital has been increased by the addition of £39,900 beyond the registered capital of £100. The additional capital is divided into 99,500 ordinary shares of 4s. and 20,000 6 per cent. non-redeemable cumulative preference shares of £1 each. The 100 shares of £1 in the original capital have been sub-divided into 500 ordinary shares of 4s. each.

Tubelight Sales, Ltd.—Satisfaction to the extent of £4,000 on June 4th, 1937, of debenture dated May 31st, 1935, and registered June 1st, 1935.

Aron Electricity Meter, Ltd.—Satisfaction in full on or about March 31st, 1925, of debentures authorised January 11th, 1911, and covered by trust deed dated April 25th, 1911, and registered May 4th, 1911. Notice filed June 18th, 1937. (According to the

register of mortgages the trust deed registered May 4th, 1911, originally secured £100,000.)

Gibrico Electric, Ltd.—Capital, £1,000 in £1 shares. Return dated May 8th, 1936 (filed May 14th, 1937). 800 shares taken up. £400 paid. £400 considered as paid. Mortgages and charges, nil.

Reflexon (Rutland), Ltd.—The nominal capital has been increased by the addition of £1,000 beyond the registered capital of £1,000. The additional capital is divided into 20,000 ordinary shares of 1s. each.

Terrell Industrial Corporation, Ltd.—The nominal capital has been increased by the addition of £300 beyond the registered capital of £100. The additional capital is divided into 6,000 ordinary shares of 1s. each.

Steriphone Co., Ltd.—Capital, £1,000 in £1 shares. Return dated April 6th, 1937. 902 shares taken up. £402 paid. £500 considered as paid. Mortgages and charges, nil.

Kidderminster and District Electric Supply Co., Ltd.—Capital, £100,000 in 5,000 preference and 5,000 ordinary shares of £10. Return dated March 26th, 1937. All shares taken up. £100,000 paid. Mortgages and charges, nil.

Westminster Electric Supply Corporation, Ltd.—Capital, £2,000,000 in 550,000 preference and 1,450,000 ordinary shares of £1. Return dated March 22nd, 1937. All shares taken up. £1,305,620 paid on 755,620 ordinary and 550,000 preference shares. £694,380 considered as paid. Mortgages and charges, nil.

Windsor Electrical Installation Co., Ltd.—Capital, £150,000 in 65,000 ordinary, 50,000 5 per cent. preference, 25,000 7 per cent. preference and 10,000 unclassified shares, all of £1. Return dated March 16th, 1937. 65,000 ordinary, 23,532 5 per cent. preference and 25,000 7 per cent. preference shares taken up. £88,532 paid on 65,000 ordinary and 23,532 5 per cent. preference shares. £25,000 considered as paid on 25,000 7 per cent. preference. Mortgages and charges, nil.

Escott Brothers, Ltd.—The nominal capital has been increased by the addition of £6,500, in £1 ordinary shares, beyond the registered capital of £7,000.

R.R., Ltd.—S. H. Gillett, 24, Basinghall Street, E.C., ceased to act as receiver and manager on June 18th.

Vent-Axia, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated June 10th, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Trevor Fry, Ltd.—Particulars filed of £1,000 debentures, authorised June 3rd, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £750.

Air-Way, Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated June 11th, to secure £5,580 and all amounts now or hereafter becoming due not exceeding £25,000. Holders: Bankers Commercial Security, Ltd.

National Electric Construction Co., Ltd.—Satisfaction in full on May 1st, 1937, of 5 per cent. debentures, authorised by resolutions of May 6th and 7th, 1908, and registered May 23rd, 1907, securing £75,000.

City Notes

The Electrical Finance & Securities Co., Ltd., held its annual meeting on June 24th when Mr. G. H. Nisbett (chairman), who presided, said that during the year under review all their subsidiaries continued to make good progress. The number of consumers connected to the mains had increased by the following percentages: Northwood 25 per cent., Pinner 11 per cent., Rickmansworth 28 per cent., Boston 16 per cent., and Lothians 15 per cent. The aggregate kWh sold had increased by 24 per cent., whereas the gross revenue had grown by only 14 per cent., the difference between the two figures being a measure of the reduced charges they had made. Very similar progress was apparent in the returns for the expired period of this year. In face of these results one could only express surprise at the Government's apparent intention to proceed with a new enactment based upon the McGowan Report, but even more bureaucratic and socialistic than those recommendations. Legislation had been the curse of the electricity supply industry. The present proposals involved the handing over of the greater part of distribution in this country to regional bodies arbitrarily chosen. In order to effect a grouping of authorities compulsory purchase was to be applied in many cases, and it was suggested that the new governing authorities would be under strict regulation by the Electricity Commissioners. In these circumstances one could hardly imagine persons of responsibility and experience consenting to serve. The proposals, too, would involve the putting into the melting pot of the bulk of the goodwill which had been laboriously built up over many years by the present authorities. That there was no need for radical interference of this kind with the present general management of electricity distribution was evident from the fact that progress had been phenomenal during the past few years and far ahead of that made by any other nation in the world. Fortunately, opposition to the proposals was already widespread and growing in volume, and he did not think they were likely to receive the sanction of Parliament in anything like their present form.

Radiovisor Parent, Ltd., held its annual meeting on June 23rd when Lt.-Col. the Hon. A. C. Murray (chairman), who presided, said that during the last few years the varying uses to which the company's light-control system could be applied had been steadily increasing. One of the most important was the Radiovisor lighting unit which was being increasingly used for street lighting. Within the metropolitan area of London over 150 miles of street lighting was now controlled by the Radiovisor system. It was also used for many other purposes, including the control of office illumination, shops, factories, railway and works yards. Besides this country, the unit was in operation in the East, South Africa, New Zealand, and Palestine. Another important activity of the company related to the automatic control of smoke, and their smoke indicator had been installed by most of the important power stations in England and in industrial plants. Among other operations which were carried out by the Radiovisor method of light control were temperature control of electric steel-bar heating and upsetting machines for the automobile trade, and paper feed and join-up control for newsprint machines, &c. The counting of moving articles by light control was steadily progressing. The company's counting apparatus, height gauge, and visibility apparatus were installed as part of the working equipment in the Mersey Tunnel. One of the latest uses to which their light control had been applied was in connection with oil-fired furnaces or burners. The company had from time to time been approached by firms desirous of effecting some industrial operation by light-actuated methods. In such cases the company co-operated in an endeavour to find a solution.

The Barcelona Traction, Light & Power Co. has issued a circular explaining why it is impracticable to issue the annual report and accounts, as is customary at this period of the year. It is stated that since the issue of the two circulars last year general conditions in Spain have steadily grown worse, and it has been found impossible to obtain any reliable information as to the true position of the affairs of the enterprise. The seizure effected by the Workers' Committee covered all the properties, funds and banking accounts of the enterprise. It was believed that since September last certain damage had been sustained by the properties of the enterprise, but no definite information was available. It had also been impossible to ascertain whether the operation of the enterprise was being carried on in a correct manner. In the meantime it had been necessary to suspend the payment of the interest and the operation of the sinking funds of the several bond issues of the company.

John Ismay & Sons, Ltd.—Presiding at the annual meeting held on June 25th Mr. J. Ismay (chairman and managing director) said that in pursuance of the policy outlined at the last meeting they had disposed of some of their investments and strengthened the cash position, their intention being to restrict themselves principally to the manufacture of lamps and their components. Other lines they were leaving to the associated companies of the Ismay Industries group. Their lamp sales had steadily expanded during the year. Sales both at home and abroad were greater than in the previous year, but owing to the keenness of competition the trading profit was only a few thousand pounds up. They were again extending the factory at Ilford and their capacity during the coming year would be about 12 million lamps, an increase of approximately 50 per cent. The demand for their lamps was continuing, and they were now supplying many more Government departments and corporations.

Mirrlees, Bickerton & Day, Ltd.—A suggestion that Diesel-engine manufacturers should co-operate to secure reduced costs of manufacture by rationisation was made by Mr. Charles Day, chairman, at the annual meeting held on Friday. As a very large proportion of the orders came from overseas where world-wide competition had to be faced, the problem of economic production was very important. While there was a growing opening for Diesel engines for the propulsion of small vessels, there was no tariff protection and Continental competition was very keen. The value of orders in this section was about double the average for the last six years and consequently the current year had started with a great deal of work in hand. Important orders were reported for condensing plant and centrifugal pumps, and arrangements had been made to manufacture the "Gill" axial flow pump. Satisfactory progress had been made in the "Combustioneer" stoker department.

James Keith & Blackman Co., Ltd.—A new factory and head offices, capable of double the output of the present Holloway works, are to be erected on an 11-acre site at Ferry Lane, Tottenham, as a result of the company's growing volume of business. This was announced by Mr. George Keith, chairman and managing director, at the ordinary general meeting on Friday. At a subsequent extraordinary general meeting it was unanimously decided to change the name of the company to Keith Blackman, Ltd., and to authorise the increase of the capital of the company to £500,000, by the creation of 150,000 new 5½ per cent. cumulative preference shares of £1 each and 200,000 ordinary shares of 10s. each. It is proposed to issue 100,000 new cumulative preference shares and 100,000 new ordinary shares by offering the former at 20s. 6d. per share to existing ordinary shareholders *pro rata*. These preference shares will carry an option to take up one new ordinary share at 22s. 6d. for each preference share applied for.

The Electric Construction Co., Ltd., held its annual meeting on June 25th when Mr. J. Gray (chairman and managing director), who presided, said that the number of machines produced during the year under review exceeded any previous output in the company's history. The output of switchgear, transformers and rectifiers also showed very satisfactory increases. Good progress was being made with the addition to the buildings. This was being made to enable them to carry on more efficiently and economically certain operations for which, so far, tentative arrangements only had been made. The addition would at the same time permit of an enlarged output. The orders received since the beginning of the new financial year showed a substantial increase on the corresponding period of 1936, and the prospects were promising.

The Palestine Electric Corporation, Ltd., reports that during 1936, despite abnormal conditions in Palestine, a satisfactory service was maintained throughout its supply area. Its property suffered no appreciable damage, but there was some delay in development work and a small amount of additional expenditure was inevitably incurred. Sales of electricity amounted to 65,495,957 kWh, as against 50,362,193 kWh, and the number of consumers increased from 53,246 to 66,537. The gross revenue was £P582,765 (£P488,443), and the profit, after provision for depreciation, was £P242,208 (£P230,914). After allocating £P12,000 (same) to preference shares sinking

fund and £P70,440 to preference and ordinary dividends, it is proposed to transfer £P25,000 (£P40,000) to reserve for income tax and contingencies and £P50,000 to general reserve and pay a final dividend of 5 per cent., tax free, on the ordinary and "A" ordinary shares, carrying forward £P24,240 (£P26,353).

It is proposed to hold a meeting on July 15th at which proposals will be submitted for increasing the capital from £2,500,000 to £4,000,000 and amending the articles of association. It is intended to make a public issue on terms to be decided later. The new capital is required to provide for outlay incurred and which may be incurred.

Broom & Wade, Ltd.—A resolution to increase the capital of the company to £290,000 by the creation of 100,000 new shares of 5s. each was carried unanimously at an extraordinary general meeting held on Monday. Explaining the need for the larger capital, Mr. Harry S. Broom, chairman, said that business overseas, particularly in the Dominions and Colonies, had been progressively greater in the last few years, and it had been necessary to increase stocks held abroad. A very large proportion of orders for portable plants placed by municipal and public works authorities was being placed with the company. The company's subsidiary, B.E.N. Patents, Ltd., continued to make satisfactory progress and had several new developments which were already producing excellent business.

Hick, Hargreaves & Co., Ltd.—A large increase in the value of contracts secured in all sections of the company's business was reported by Mr. W. D'Arcy Madden, chairman and managing director, at last Friday's annual general meeting. Condensing plant and auxiliaries, he said, remained the largest and most important section of the company's business, and orders obtained during the past year included two 50,000-kW plants for the Ironbridge power station, two 30,000-kW plants for the new Littlebrook power station of the Kent Electric Power Co., and a 30,000-kW plant for the Hackney Borough Council. Condensing plant orders had been taken also for Adelaide, Australia, and Hong-Kong. The demand for evaporators and deaerators had been increasingly satisfactory, and the turbine and turbo-compressor department had been fully occupied. The outlook for the current year was favourable.

Aron Electricity Meter, Ltd.—Presenting his report at the ordinary general meeting last Friday Mr. Harry Kahn, chairman and managing director, said that as the present factories were only just capable of dealing with the orders received and did not allow for any further expansion for the development of new types of meters adjacent premises had been acquired. The cost of this acquisition would necessitate further capital, but as to this no plans could be made for some time to come. The financial position continued to be very strong and up to the present this year the turnover both in London and Austria again showed increases.

The Globe Telegraph & Trust Co., Ltd.—Speaking at the company's annual general meeting on Monday the Earl of Midleton, chairman, said that results were encouraging and the raising of the dividend from 4½ to 5½ per cent. might be taken as a harbinger of better dividends in future. The company's main holding, that in Cable and Wireless, Ltd., had shown a considerable improvement during the year, and that company had now reached a position to deal with arrears. The recent reorganisation of capital should affect the Trust favourably in the near future.

The Metropolitan Electric Supply Co., Ltd.—Meetings of the following subsidiaries of this company were held on June 21st at which proposals to increase their capitals to the extent shown were approved:—Chesham Electric Light & Power: To £300,000 by the creation of 75,000 £1 ordinary shares. Egham and Staines Electricity: To £850,000 by the creation of 150,000 £1 ordinary shares. Slough and Datchet Electric Supply: To £450,000 by the creation of 100,000 £1 ordinary shares. Uxbridge and District Electric Supply: To £1,250,000 by the creation of 250,000 £1 ordinary shares.

The Atlas Electric & General Trust reports an income for the year ended March 31st, after providing for taxation, of £235,633 as compared with £215,017 in the preceding year. After deducting debenture interest, &c., there is a credit balance of £181,719, which with £17,210 brought in makes £198,929. The dividend on the 7 per cent. cumulative preference shares is paid, less tax, and £37,929 is carried forward. Operations of the subsidiary, Sociedad Comercial de Montevideo, were adversely affected by a strike of the tramway employés in April, 1936, and by the terms of the settlement imposed upon the company by the Government of Uruguay.

The Pernambuco Tramways & Power Co., Ltd., reports that the net revenues from operation amounted last year to £69,247 against £47,630 in the preceding year. After providing £23,209 (£17,828) for depreciation and meeting fixed charges there was a debit balance of £2,449 (£31,876). The total deficit at December 31st last was £143,890. The improvement in revenue is due to the application of new rates and fares, to the general improvement in business conditions in the territory served and to the waiving of interest by the Brazilian Electric Power Co., Ltd.

Berry's Electric (1928), Ltd., reports a trading profit of £39,111 for the year ended March 31st last, as against £26,444 for the preceding year. A final dividend of 3½ per cent., making 6 per cent. free of tax (5 per cent.), is to be paid, and £12,304 (£3,039) is carried forward. An increased demand for the company's products is reported and this has been well maintained since the closing of the accounts.

Newman & Watson (incorporated in May, 1936) report a profit for the year ended March 31st of £12,912. Income-tax absorbs £3,530 and profits amounting to £3,295 earned prior to completion of the vending agreements have been transferred to reserve. It is proposed to pay a final ordinary dividend of 2½ per cent., making 7½ per cent. for the period from July 9th, 1936, to March 31st, 1937, and to carry forward £241.

The Kalgoorlie Electric Tramways, Ltd., report gross receipts of £30,372 for 1936, against £29,072 for 1935. The net profit, before providing for interest on the "B" debenture stock, was £3,502 (£2,493). The trustees are making a further distribution of 2½ per cent. on account of capital of "B" debenture stock.

The Mexican Light & Power Co., Ltd.—Mr. Miller Lash, chairman, stated at the annual general meeting at Toronto on Tuesday that the operating results would not permit payment of the January and July interest on the 6 per cent. cumulative income debenture stock. Present business conditions in Mexico were, however, exceptionally good. The political situation was calm and the Government finances were improving.

Greenwood & Batley report a profit for the year to March 31st of £64,315, as compared with £46,300 in the preceding year, which with £22,222 brought in makes £86,537. After deducting debenture interest, depreciation, &c., a dividend of 7 per cent. is paid on the ordinary shares for the year (against 4½ per cent.) and £22,255 is carried forward.

Aveling-Barford, Ltd.—The introduction of the company's shares on the Stock Exchange is anticipated shortly. The company has an authorised capital of £375,000 in £175,000 £1 5½ per cent. cumulative preference shares, 160,000 of which are being issued, and 800,000 5s. ordinary shares, of which 640,000 are being issued.

The County of London Electric Supply Co., Ltd., has purchased the Ramsgate and District Electric Supply Co., whose capital of £150,000 has hitherto been held by Edmundson's Electricity Corporation.

The Monteney Railway, Light & Power Co. reports net earnings for 1936 amounting to $242,648, after allowing for depreciation. This compares with $198,239 in the preceding year. After providing for debenture interest, &c., there is a surplus of $99,471, as against $48,572.

Ruston & Hornsby, Ltd.—Presiding at the annual general meeting held on Tuesday Mr. J. S. Ruston reported a continued improvement in trading results last year. He suggested that the time had arrived to withdraw the remaining tariff and restrictions on the import of steel.

The Nico Light Co. reports a net profit for the year ended March 31st of £5,123, as against £3,692 for the previous year. It is proposed to pay a dividend of 6¼ per cent. (against 5 per cent), and to carry forward £3,075.

The Metropolitan Electric Cable & Construction Co., Ltd., records a net profit of £24,695 for 1936, as against £19,114 in 1935. It is proposed to pay an ordinary dividend of 5 per cent., tax free (same), and to carry forward £1,265 (£1,344).

The Perak River Hydro-Electric Power Co., Ltd., has notified holders of its £400,000 4 per cent. prior lien debenture stock of its intention to redeem the whole of the stock on July 21st next at par.

The Mexico Tramways Co., Ltd.—At the annual meeting of the company at Toronto on Tuesday, Mr. Miller Lash, chairman, declared that a reorganisation of all transport facilities in the federal district of Mexico was needed.

The Revo Electric Co., Ltd., is extending its factory by a further 100,000 ft. of floor space, and *not* 10,000 ft. as stated in our last issue.

The Power Corporation of Canada, Ltd., announces an interim dividend of 25 cents per share on its no par common stock.

The Great Northern Telegraph Co., Ltd., of Denmark announces an interim dividend of 2½ per cent. (same) for the first half of the current year.

The London Electric Wire Co. & Smiths, Ltd., is paying an interim dividend of 2 per cent., less tax (same).

Stocks and Shares

TUESDAY EVENING.

THE Stock Exchange markets received a tonic in the shape of the Treasury's decision to add £200 million to the Exchange Equalisation Fund, the main effect of which, from the purely Stock Exchange point of view, is that this may be expected to maintain the price of gold in the neighbourhood of £7 per ounce. Had the price of gold gone down, as was feared might be the case, this would probably have reacted upon prices of commodities and general goods, affecting the rate of yield obtainable from stocks and shares, and thereby bringing about a general decline in prices of securities. The Treasury's action is regarded as tantamount to a decision, on the part of the Government, to maintain the price of gold and, therefore, the prices of other things as well. Consequent upon this announcement, the atmosphere of depression gave way to a more cheerful sentiment, but the improvement was short-lived. The price of War Loan dipped below 100, taking other gilt-edged issues in its train. The closing of the Paris Bourse accentuated the previous uneasiness felt in connection with Continental politics, and introduced another factor that operated in restraint of Stock Exchange activity.

Gilt-edged Stocks

The gilt-edged market is dull and heavy. In addition to the renewed anxiety felt over the developments in the franc, a further cause of weakness was the almost complete failure of the big L.C.C. issue to attract public subscription. The market having apparently lost, for the time being, support from the public and the big institutions, prices are suffering the usual disproportionate effect of moderate selling. As a result War Loan, as mentioned previously, is now below par and the whole list of Government stocks has sagged. Observers are mindful, nevertheless, of the pressure of unemployed money, which should—at least in theory—grow greater with the release of dividend funds at the half-year. Gilt-edged issues connected with electrical undertakings have remained tolerably

steady. Prices of Central Electricity Board issues are unaltered on the week. London Electric Transport 2½ per cents. are 2 points lower at 89.

L.C.C. and the Government "Plan"

On the Tuesday in this week the Public Control Committee of the L.C.C. presented a report to the Council in which the Committee advised the L.C.C. not to support the Government's electricity reorganisation scheme, so far as this affects London. The Committee points out that, under the Government's scheme there will be about eight bodies in the County of London and twenty-two in Greater London charged with the distribution of electricity. The L.C.C. Committee maintains that such a division would not be regarded as dealing adequately with the problem.

Electric Supply Corporation's shares have fallen 3s. 3d. to 2$\frac{2}{16}$. Dullness in the provincial list is evident in the declines marked against Bournemouth and Poole, Yorkshire Electrics and Midland Counties. Scottish Power eased off to 36s. The premium on the recently issued Metropolitan Electric new ordinary is now 7s. 6d. Business in this section has fallen upon quiet days: "I have never seen anything like it," lamented a dealer in the shares. But he is still young.

Cable and Wireless

Good buying of Cable and Wireless ordinary stocks developed after confirmation, in the Courts, of the company's capital reorganisation scheme. The price of the "A" ordinary spurted from 24 to 25¼, and that of the "B" from 6 to 6¼. It was a little surprising not to find Globe Telegraph and Trust issues joining in the movement, particularly in view of the confident tone of the company's annual meeting. The dividend on Globe ordinary shares has been raised this year from 4½ per cent. to 5½ per cent.; the chairman's view is that, with the aid of a prospective return on the large holding of Cable and Wireless ordinary stock, a further increase can be hoped for in next year's distribution. Among transatlantic communication stocks, Western Unions at 43 are flat on the Federal Communications Committee's decision referred to on page 982 of last week's issue of the ELECTRICAL REVIEW. American "Tel. and Tel.," at 162½, show a drop of 4 points on the week.

Coming Cairo Conference

The next International Communications Conference will be held at Cairo in February, 1938, when the International Telegraph Regulations come up for revision. The United States has never signed these regulations, but at Cairo, next spring, it is possible that America may come into the scheme, provided the regulations are satisfactory to the U.S.A. Austerely, it is doubtful whether the United States, not having signed the regulations, is entitled to participate in the Conference, but in view of the importance of American communications traffic it is unlikely that the U.S.A. will be excluded.

Atlas Trust

The Atlas Electric and General Trust report, just issued, fell rather short of general expectations, as is witnessed by a drop from 6s. 3d. to 5s. 9d. in the price of the ordinary shares. Satisfaction with the moderate expansion in revenue was offset by a depressing statement on the difficulties of the Montevideo electric traction subsidiary, which is entered in the balance sheet at little short of £4¼ millions. Progress in this direction has been severely obstructed by the local Government's attitude, resulting in a net loss to the company on the year. Atlas Trust 7 per cent. preference shares, on which the dividend is fully covered by current earnings, are quoted at 26s., to yield 5$\frac{3}{8}$ per cent. on the money. On the 7½ per cent. preference shares of Whitehall Electric Investment Company, which has some resemblance in structure, and a marked similarity in this year's results, to the Atlas concern, the yield is over 6$\frac{3}{4}$ per cent.; some people think that the difference between the two yields is unduly wide.

Palestine Electric Corporation

Palestine Electric ordinary shares have declined in value fairly steadily since the close of last year, when the quotation was well over 50s. The price fell further, to 38s. 6d., on news of a proposed increase in the company's capital, to be followed by a public issue; the announcement came shortly after declaration of a 7½ per cent. dividend, tax free, on the ordinary and "A" ordinary capital, which is at the same rate as for the two previous years. Neither the size nor the terms of the intended offer are at present known; from the substantial nature of the capital scheme, people are led to infer that the issue may be on a correspondingly large scale. This may account for the latest drop in the price of the shares. The past month's decline can also, however, be attributed partly to fears of local unrest and partly to market conditions.

Miscellaneous Matters

Aron Meters have fallen ½ to 50s., although the annual meeting was satisfactory, the chairman's speech being regarded as encouraging. General Electrics are a little better at 79s. Electric Constructions are unchanged on the meeting. Brush ordinary has lost 2 points at 49½. Ever Ready shares are again 6d. better at 33s. In the traction group, Tillings eased off to £3. Brazilian Tractions, fluctuating erratically, show improvement at 23¾. The iron and steel market, after a display of firmness, fell in with depression prevailing elsewhere. The rubber share market is tranquil to the verge of being stagnant.

Share List of Electrical Companies

	Nom.	Dividend. Previous.	Dividend. Last.	Price. June 29	Rise or Fall.	Yield. p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	67/6	−½	4 9 0
City of London	1	7½	7½	33/–	—	4 11 0
Clyde Valley	1	7	8	39/–	—	4 2 1
County of London	1	10½	10½	46/6	—	4 10 6
Edmundson's 7% Pref.	1	7	7	34/–	—	4 2 4
Do. Ord.	1	8	9	40/–	—	4 10 0
Elec. Dis. Yorkshire	1	9	9	42/6	—	4 4 10
Elec. Fin. and Securities	1	12½	12½	2½	—	4 13 0
Elec. Supply Corporation	1	11	12	51/3	−3/3	4 13 8
Lancs Light and Power	1	7½	7½	33/6	—	4 9 7
Lond. Assoc. Electric	1	—	7	31/3	—	4 9 6
London Electric	1	7	8	35/6	—	4 10 2
London Power Deb. Red.	Stock	5	5	106½	—	4 14 0
Metropolitan	1	10	10	45/–	—	4 9 0
Midland Counties	1	7½	8	36/–	−1/–	4 9 0
Mid. Elec. Power	1	8	9	2	—	4 10 0
North Eastern Electric Ordinary	1	6	7	31/6	—	4 9 0
Do. 7% Pref.	1	7	7	34/6	—	4 1 2
Northampton	1	10	10	45/–	—	4 9 0
Notting Hill 6% Pref.	10	6	6	14	—	4 5 9
North Met. Elec. Ordinary	1	10	10	46/3	—	4 6 7
Do. do. 6% Pref.	1	6	6	31/–	—	3 17 5
Scottish Power	1	8	8	36/–	−6d.	4 9 0
South London	1	7	7	32/–	—	4 7 6
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	22/–	—	6 16 4
Yorkshire Elec.	1	8	8	39/–	−1/6	4 2 1
PUBLIC BOARDS.						
Central Electricity, 1950–70	Stock	5	5	114	—	4 7 9
Do. 1955–75	,,	5	5	115½	—	4 6 7
Do. 1951–73	,,	4½	4½	109	—	4 2 7
Do. 1963–93	,,	—	3½	97½	—	3 11 10
London Elec. Trans. Gtd.	,,	—	2½	89	−2	2 16 0
London & Home Counties, 1955–75	,,	4½	4½	111	—	4 1 1
London Passenger Transport, A	,,	—	4½	116½	—	3 17 3
Do. do. B	,,	—	5	117½	—	4 5 1
Do. do. C	,,	4	4	80	−1	5 0 0
West Midlands Joint Elec. 1948–68	,,	—	5	111½	—	4 9 8
TELEGRAPH AND TELEPHONE.						
American Tel. & Tel.	$160	9	9	162½	−4	5 10 9
Anglo-Am. Tel. Pref.	Stock	6	6	126	—	4 15 3
Do. Def.	,,	1½	1½	29½	—	5 1 8
Cable & Wireless 5½% Pref.	,,	4½	5½	111½	—	4 18 3
Do. A. 7½% Ord.	,,	Nil	Nil	25¼	+1¼	—
Do. B. Ord.	,,	Nil	Nil	6¼	+¼	—
Globe Tel. & Tel. Ord.	10	4½*	5½*	15¾	—	3 9 10
Do. do. Pref.	10	6	6	14	—	4 5 9
Great Northern Tel.	10	20	20	42½	+½	4 14 1
Marconi-Marine	1	10	7½	1¾	—	4 5 9
Oriental Telephone Ord.	1	12*	12*	3½	—	3 16 10
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	Nil	Nil	5/–	—	—
Do. do. 2nd Pref.	5	Nil	Nil	3/9	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	21½	—	—
British Electric Traction Def. Ord.	,,	5	5	1275	—	—
Do. do. Pref. Ord.	,,	8	8	165	—	4 15 5
Brazil Traction	$100	40 cts.	50 cts.	23¾	+¼	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	105½	—	4 14 9
Mexican Light Common	$100	Nil	Nil	2	—	—
Do. 1st Bonds	$500	5	5	44½	—	—
Victoria Falls Ord.	1	20	12	63/9	—	3 18 0
West Riding	1	6½	10	45/–	—	4 9 0
MANUFACTURING COMPANIES.						
Aron Electricity Ord.	1	15	15	2½	−¼	6 0 0
Assoc. Elec. Ord.	1	8	10	47/–	—	4 5 2
Do. Pref.	1	8	8	37/6	—	4 5 3
Babcock & Wilcox	1	8	10	48/9	—	4 2 0
British Aluminium Ord.	1	7½	10	50/–	—	4 0 0
British Insulated Ord.	Stock	20	20	4¾	—	4 6 6
Brush Ord.	Stock	Nil	Nil	49½	−2	—
Callender's	1	15	15	4½	—	3 4 0
Do. 6½% Pref.	1	6½	6½	30/–	—	4 6 8
Crompton Parkinson Ord.	5/–	12½	12½	57/6	—	—
Do. 8% Pref.	1	8	8	37/6	—	4 5 4
Electric Construction	1	7	10	37/6	—	5 6 8
Enfield Cable Ord.	1	25	25	5¾	—	4 9 0
English Electric	1	Nil	Nil	32/6	—	—
Do. do. Pref.	1	6½	6½	26/–	—	5 8 4
Ericsson Tel.	5/–	20	25	2¾	—	2 12 8
Ever Ready	5/–	35	45	33/–	+6d.	6 16 6
Ferranti Pref.	1	7	7	26/3	—	5 2 10
G.E.C. Pref.	1	6½	6½	32/6	—	4 0 0
Do. Ord.	1	15	17½	79/–	+6d.	4 8 7
Henley's	5/–	30	15	19/6	—	3 17 0
Do. 4½% Pref.	1	4½	4½	1½	—	4 0 0
India-Rubber Pref.	1	5½	5½	22/6	—	4 17 9
Johnson & Phillips	1	7½	10	42/–	—	4 15 3
Lancashire Dynamo	1	10	20	3⅛	—	6 1 0
Siemens Ord.	1	6	7½	32/6	—	4 12 4
Telegraph Construction	£1	Nil	7½	2⅛	—	3 8 8

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1935

24756. "Supply arrangement for television apparatus." Radiokt.-Ges. D. S. Loewe. September 8th, 1934. (466770.)

24844. "Electric motors." E. Sparks. September 6th, 1935. (Cognate application, 21780/36.) (466771.)

29897. "Lever-operated electric switches." C. H. Parsons, Ltd., and G. B. Handley. October 30th, 1935. (466745.)

29925. "Electrically operated race-game apparatus." E. S. Lennard. October 19th, 1936. (466748.)

30240. "Electrolytic process for the hydrogenation of carbonaceous material." W. Thomas and E. L. Davies. November 1st, 1935. (466708.)

32633. "Television system." Trutolife Television Co., Ltd., and D. S. B. Shannon. November 25th, 1935. (466604.)

33297. "Television and like systems." Baird Television, Ltd., and G. W. White. December 2nd, 1935. (466715.)

33372. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., and W. R. Holland. December 2nd, 1935. (466719.)

33373. "Electric discharge devices." British Thomson-Houston Co., Ltd., K. J. R. Wilkinson and G. W. Carter. December 2nd, 1935. (466848.)

33415. "Optical systems associated with Nipkow discs in television apparatus and the like." General Electric Co., Ltd., and G. W. Edwards. December 3rd, 1935. (466780.)

33484. "Television receivers." Marconi's Wireless Telegraph Co., Ltd., and A. A. Linsell. December 3rd, 1935. (466756.)

33595. "Cathode-ray tubes." Fernseh Akt.-Ges. December 4th, 1934. (466790.)

33664. "Wireless or like receivers of the superheterodyne type." Marconi's Wireless Telegraph Co., Ltd. December 4th, 1934. (466854.)

33880. "Translating mechanism for type-printing telegraph apparatus and the like." Creed & Co., Ltd., and R. D. Salmon. December 6th, 1935. (466815.)

34193. "Electric motor control systems." General Electric Co., Ltd., E. H. Croft and J. F. Pye. December 10th, 1935. (466819.)

34668. "Gas-blast switches." British Thomson-Houston Co., Ltd. December 13th, 1934. (466820.)

34790. "Electric connectors and terminals for electric leads." F. S. Lobl. December 14th, 1935. (466821.)

35136. "Electric arc-welding apparatus." British Thomson-Houston Co., Ltd. December 28th, 1934. (466822.)

35323. "Electric coils." C. J. Owen and Westminster Tool & Electric Co., Ltd. December 20th, 1935. (466824.)

35600. "Electrolytic condensers." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. January 8th, 1935. (466825.)

35699. "Cathode-ray tubes." E. Ruska and Fernseh Akt.-Ges. December 24th, 1935. (466826.)

1936

1994. "Electric switches of the tumbler-operated type." Wandsworth Electrical Manufacturing Co., Ltd., and T. Batchelor. January 22nd, 1936. (466829.)

2294. "Answer-back device for teleprinter systems." C. Lorenz Akt.-Ges. January 30th, 1935. (466673.)

2842. "Shades for electric or other lamps." Euston Manufacturing Co., Ltd., A. H. Curtis and G. F. Dandridge. January 30th, 1936. (466615.)

2993. "Switches for converting electric currents." General Electric Co., Ltd., and R. Le Rossignol. January 31st, 1936. (466830.)

3872. "Control of thermionic devices." British Thomson-Houston Co., Ltd. February 9th, 1935. (466831.)

5205. "Electrical equipment." G. M. Pestarini. February 20th, 1936. (466834.)

5458. "Method for producing ferro-magnetic powdered-iron cores." E. Michaelis. February 23rd, 1935. (466678.)

5506. "Electric clocks." S. F. Philpott and F. Mercer. February 25th, 1936. (466679.)

6379. "Method of manufacturing junction boxes for electrical wiring." E. J. Trawford. March 3rd, 1936. (466760.)

6725. "Apparatus for producing electron streams of great energy." Siemens-Schuckertwerke Akt.-Ges. March 6th, 1935. (466836.)

16137. "Radio and other high-frequency circuit arrangements." Marconi's Wireless Telegraph Co., Ltd. June 15th, 1935. (466686.)

16272. "Accumulators or electric storage batteries." J. Pearson. June 11th, 1936. (466312.)

18182. "Permanent magnets and methods of manufacturing the same." British Thomson-Houston Co., Ltd. December 20th, 1934. (Divided out of 33503/35.) (466762.)

19225. "Synchronous motor clocks and synchronous motor clock systems." Siemens & Halske Akt.-Ges. July 16th, 1935. (466692.)

24061. "Motor-power installations." British Thomson-Houston Co., Ltd. September 5th, 1935. (466644.)

25028. "Electric discharge lamps." H. Von Hartel. September 14th, 1936. (466647.)

25355 "Television receivers." Marconi's Wireless Telegraph Co., Ltd., and A. A. Linsell. December 3rd, 1935. (Divided out of 466756.) (466866.)

32548. "Method of electrically spot-welding metal to eliminate indentation of one face." W. Meacher. November 27th, 1936. (466699.)

34263. "Time-measuring apparatus driven by a synchronous motor and an auxiliary movement." Landis & Gyr. Akt.-Ges. December 18th, 1935. (466746.)

34330. "Electric discharge tubes with mercury cathodes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. December 16th, 1935. (466654.)

1937

519. "Electric amplifier circuits." Siemens & Halske Akt.-Ges. January 7th, 1936. (Addition to 466132.) (466767.)

913. "Production of the electrodes of electric accumulators." Chloride Electrical Storage Co., Ltd. February 12th, 1936. (466702.)

13372. "Means for discharging electricity from materials and machinery." C. R. A. Chadfield. December 3rd, 1935. (Divided out of 466579.) (466768.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from June 23rd:—

Discavox. No. 567769. Class 8. Sound recording and reproducing apparatus.—George Kingsley, trading as the Dictating Machine Co., 32, Victoria Street, Westminster, S.W.1.

Metrosil. No. 575414. Class 8. Electrical resistances composed principally of ball clay, carborundum and graphite.—Metropolitan-Vickers Electrical Co., Ltd., 1, Kingsway, W.C.2.

Trolita. No. 577264. All goods in Class 8.—I. G. Farbenindustrie Gesellschaft, Frankfürt-am-Main, Germany (British representatives: Abel & Imray, 30, Southampton Buildings, Chancery Lane, W.C.2).

Philips Argenta. No. 566545. Class 13. Electric lamps (ordinary).—Philips Lamps, Ltd., 145, Charing Cross Road, W.C.2.

New Books

Electrolytic Condensers. By PHILIP R. COURSEY. 1st Edition. Pp. VIII+172; figs. 112. London: Chapman & Hall, Ltd. Price 10s. 6d.

In spite of the extensive literature on electrical engineering subjects, gaps remain in many notable places and hitherto one of these has been in the section dealing with electrolytic condensers. True, as the author states, a good deal of scattered information has been published in the form of scientific papers and, of course, in patent specifications, but no single work of a comprehensive nature has appeared of recent years prior to the present volume which is thus a necessary addition to textbook records of current electrical engineering technique and practice.

The book embraces wet, semi-dry and dry electrolytic condensers and describes their construction and manufacture. Chapters are included on testing methods and apparatus, electrical characteristics, and on applications of electrolytic condensers. The work may be regarded as complementary to the author's 1927 book on "Electrical Condensers" and the two form an authoritative study of static condenser theory and practice.

Thermodynamics Applied to Heat Engines. By E. H. LEWITT. B.Sc., A.M.I.Mech.E. Pp. 376; figs. 120. London: Sir Isaac Pitman & Sons, Ltd. Price 15s.

To reach a second edition may be regarded as a tribute to the excellence of any book, especially a scientific textbook, as it proves that it satisfies a want. This book was written to meet the requirements of students studying for the B.Sc. examination in engineering and for the examination for associate membership of the Institution of Mechanical Engineers. Not only does it cover the fairly comprehensive "thermodynamics" syllabus issued by the examining bodies, but at the conclusion of the various chapters a number of examples are included, many of which have been drawn from the actual examination papers set by these bodies. As the numerical answers are given, the student is able to obtain a good idea of the scope of the examination for which he is preparing. He can also check the accuracy of his work and thus realise whether or not he is on the right lines.

While written primarily for the student, this book is suitable for a wider circle. The electrical engineer who is desirous of understanding the fundamental principles of the various types of heat engine used for driving his generators will find that a study of this book will amply repay him as the fundamental principles underlying the operation of the steam turbine and the internal-combustion engine are clearly and progressively dealt with. The author assumes that his readers possess an elementary knowledge of physics and mathematics.

Shorter Notices

"Business Budgets and Budgetary Control," by A. W. Willsmore. (Pp. 241; 21 figs.) London: Sir Isaac Pitman & Sons, Ltd. Price 10s. 6d. net. This is the second issue of a work based on practical experience with a large electrical manufacturing organisation operating on a "special orders" basis. The new matter includes the results of experience in the opposite type of manufacturing industry—large-scale production of standard products for sale from stock. The book also contains a summary of results obtained from the application of budget control principles. Some of the matter has appeared in the ELECTRICAL REVIEW in the form of articles on management topics.

"The Superheterodyne Receiver," by A. T. Witts. Pp. 182; figs. 98. Price 3s. 6d. "Electrical Definitions and Formulæ for Students," by R. Kemp. Pp. 37. Price 6d. London: Sir Isaac Pitman & Sons.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Fire station (£42,000); borough surveyor.

Addington.—Shops and flats, Lodge Lane; First National Housing Trust, Ltd., Farm House, Lodge Lane.

Aldershot.—Houses (78), Aldershot Park, Lower Farnham Road; borough surveyor.

Ashbourne.—Houses (50), Clifton Road site; D. Powell, U.D.C. surveyor.

Baguley.—Houses (200), Spinney Road, Altrincham Road; James Wild (Estates), Ltd., 42, King Street West, Manchester, 3.

Bakewell.—Houses (28), Stanton View, Yeld Road (£11,565); J. H. Cartledge, builder, Baslow.

Barking.—Houses (78), Becontree estate (Section 17), for L.C.C. (£54,931); M. J. Gleeson, Ltd., builders, Cheam, Surrey. Additions and alterations to Westbury school, Ripple Road, for E.C.; C. C. Shaw, borough architect.

Barnet.—Houses (36), Cowley Hill estate; A. J. Wilshire, R.D.C. surveyor, Boreham Wood, Hertfordshire.

Barnsley.—Houses (20), Crookes Lane, Carlton; J. R. Wilkinson, R.D.C. surveyor, 15, Regent Street.

Basford.—Houses (28), East Leake and Lambley; J. J. Ellis, R.D.C. surveyor, Rock House, Stockhill Lane, Basford.

Bedlington.—Cinema, for Wallaw Cinema Co.; G. Tower, builder, Blyth.

Birmingnam.—Cinema, Perry Barr, for Clifton Cinema (Great Barr), Ltd., Prudential Buildings, St. Philips Place, Colmore Row. Factory, New John Street West, for Brooks & Adams, Ltd., Barr Street; W. J. Whittall & Son, builders, Lancaster Street. Factory, Tower Street, for the Universal Jig and Gauge Co., Brearley Street, Aston; Maddocks & Walford, builders, Tyburn Road, Birmingham. Police training college and additions to the Digbeth Police Station; H. Pearce & Son, builders, Bordesley Green.

Bridge.—Houses (28), Blean; R. Miles, building surveyor, Council Offices, Bridge, near Canterbury.

Bristol.—Cinema, Henleaze; Stone & Co. (Bristol), Ltd., builders, Redland. Cinema, Patchway, for the Northville Building Co.; W. H. Watkins, architect, Clare Street. Additions to the works, Priest & Mullings, Ltd., Netham.

Chapel-en-le-Frith.—Premises, for the Peak Forest Co-operative Society, Ltd.

Coseley.—Houses (32), Gate Street, Tipton Road, for J. Fellows, Woodsetton, near Dudley; Coslett & Hughes, architects, Arcade Chambers, Dudley. Ice rink, café and dance hall, Birmingham Road (£50,000); W. T. Marshall & Son, builders, Willenhall.

Crook.—Extensions to premises of W. H. Girling & Co., Ltd., Silica Brickworks, Beechburn.

Croydon.—Houses (86), Davidson Road estate; borough engineer. Houses, Dunhevid Road; Croydon Building Co., Ltd. Factory, Cedar Road; Creed & Co., Ltd.. Telegraph House, Croydon. Factory, Spring Lane; H. & W. Bourne, Ltd., Spring Lane, London, S.E.25.

Denholme (NEAR BRADFORD).—Houses (41), Pitt Lane; J. H. Ingham, clerk to the Council.

Desborough.—Motor showrooms, Harborough Road, for the Desborough Motor and General Engineers, Ltd.; A. Tailby & Sons, Ltd., builders, Station Road.

Droitwich.—R.C. college and presbytery, Worcester Road (£12,000), with electrical work; J. & W. Malley, architect, 2, Wills Street, Birmingham.

Dunmow.—Houses (158), various parishes; surveyor, Council Offices, Dunmow.

Durham.—Schools, Swalwell, Bleach Green, and additions to Murton Colliery girls' school, for County E.C.; county architect, 34, Old Elvet, Durham.

Ealing.—Libraries, Whitton Avenue, Northolt, and Horsenden Lane, Perivale; F. J. Forty, borough engineer, Town Hall.

Edgware.—Buildings, for North London Collegiate school, Canon's Park (£65,000); governors.

Edinburgh.—Extensions to United Wire Works, Ltd., Broompark Avenue, Granton.

Edmonton.—Flats (310), Firs Lane; Property, Finance & Land Corporation, Ltd.

Erith.—Reconstruction of schools, Northumberland Heath Junior school, Book Street, and Crescent Road school; J. H. Clayton, U.D.C. surveyor.

Eton.—Houses (66), Chequers Orchard estate, Iver; West Urban Properties, Ltd. Houses (20), near Stomp Road, Burnham; W. G. Eyles.

Evesham.—Houses (48), Fairfield, Hampton; J. Abbott, borough surveyor.

Felling-on-Tyne.—Houses, Brettanby, High Heworth, and Wardley Colliery; U.D.C. surveyor, Council Offices, Felling-on-Tyne.

Glasgow.—Extensions to engineering works, Anniesland, for Barr & Stroud, Ltd.; Cowiesons, Ltd., builders, St. Rollox. Reconstruction of buildings, Woodilee Hospital (£25,000); city engineer.

Haltwhistle.—Houses (81), Greencroft estate; Oliver and Leeson, architects, 14, Ellison Place, Newcastle-on-Tyne.

Harrow-on-the-Hill.—Cinema, Sheepcote Road, for the Bernstein Theatres, Ltd.; G. Parker & Sons, Ltd., builders, 124, Sumner Road, London, S.E.15.

Hendon.—School, Edgware (£19,330), for Hendon E.C.

Hertfordshire.—School (£53.291) at the corner of Russell Lane and Church Hill Road, East Barnet, for C.C.; county architect, Hertford.

Holderness.—Houses (92), various sites; J. A. Andrews, R.D.C. surveyor, Council Offices, Skirlaugh, near Hull.

Hornsey.—Enlargement of Stationers' Company's school (£35,919); Newby Bros., Ltd., Chase Road, London, N.14.

Huddersfield.—Cinema, Newsome, for the owners of the Plaza Cinema, Thornton Lodge.

Ilford.—Factory buildings and laboratory, Vicarage Lane; Plessey Works, Ltd., Vicarage Lane. Shops, 207-287, Cranbrook Road; J. Aldridge, architect, 472, Eastern Avenue, Ilford.

Irthlingborough.—Houses; Craven (Builders), Ltd., Erith Road, Aylestone, Leicester.

Kent.—Radiography unit and pathological laboratory at the County Hospital, Dartford, for C.C.; W. H. Robinson, county architect, Springfield, Maidstone.

Kettering.—Extensions to factory, Wellington Street; F. S. Bryant.

Kidderminster.—Houses (83), near Highfield Road and Chester Road; F. Champ & Co.

Lancashire.—School, Davyhulme, Urmston, for C.C.; Thomas Worthington & Sons, architects, 178, Oxford Road, Manchester. School, Stockbridge Lane, Huyton, for County E.C.; H. J. Rowe, architect, 505, India Buildings. Water Street, Liverpool. School, Whiston, near Prescot, for County E.C.; L. Barnish, architect, 58, Rodney Street, Liverpool.

Leatherhead.—Houses (56), No. 7 estate; J. L. Davies, architect, Council Offices.

Leicester.—Library, Park estate (£20,720); city engineer.

Lewes (SUSSEX).—School, Mountfield Road (£38,514), for E.C.; E. H. Fuller, architect, Pelham Place, Seaford-on-Sea.

Liverpool.—Nurses' home, Victoria Central Hospital (£20,000), with electrical work; Rees & Holt, architects, Liverpool.

London.—(BERMONDSEY).—Flats, shops and restaurant, Sards Rents area (£67,654); borough engineer, Town Hall, Spa Road, S.E.16. (CAMBERWELL).—Dwellings, Friary estate (£165,110); L.C.C. architect, County Hall, S.E.1. (GREENWICH).—Houses, Creek Road (£37,000); L.C.C. architect. (HAMMERSMITH).—Shops, Old Oak Common Lane; Marshall & Tweedy, 96, New Cavendish Street, W.1. (ISLINGTON).—Remodelling, Newington Green school (£39,396); C. P. Roberts & Co., Ltd., 31, High Holborn, W.C.1. (STOKE NEWINGTON).—Shops and flats, Green Lanes; S. Jaques, 38, Gresham Street, E.C.2. (WOOLWICH).—School, Montbello Road (£31.375); L.C.C. architect.

Luton.—Cinema, George Street West, for the Associated British Cinemas; Griggs & Son, Ltd., builders, Victoria Street, London, S.W.1.

Macclesfield.—Houses (100), London Road estate; B. Hampson, borough surveyor.

Mirfield.—Houses (30), Sunny Bank Road; F. Flowett, Pontefract.

Newcastle-on-Tyne.—Houses (313), Blakelaw estate, for C.C.; G. Bailey, Ltd., builders, King Street, South Shields.

Northern Ireland.—(BELFAST).—School, Botanic Gardens Park, for E.C. (£20,289); J. Moreland, builder, Belfast.

Nottingham.—Boys' and girls' senior blocks, assembly hall, gymnasium, clinic, &c., to Bilborough schools, for E.C.; R. M. Finch, city engineer, Guildhall.

Nuneaton.—Alterations and additions to administrative block, Bramcote Isolation Hospital, for the Health Committee; borough surveyor.

Oswestry.—Cottage hospital (£24,000), with electrical work; F. Fox-Davies, architect.

Plymouth.—Houses (160) and flats, Peters Park Lane, Devonport, electrical work; city architect, Guildhall, Plymouth.

Portland.—Houses (62), Tillycoombes site; U.D.C. surveyor.

Roxburghshire.—School, Kelso (£60,000); county clerk, Newtown, St. Boswells.

Rugby.—Houses (40), Long Lawford, for the Land Settlement Association, Ltd. Factory, Coventry Road, Dunchurch, for Roberts & Co.

Rushden.—Houses (20), Irchester Road; U.D.C. surveyor.

Sheffield.—School of Art, Leader House, Surrey Street; city architect.

Sittingbourne.—Houses (26), near Gaze Hill Avenue; Norman & Clarke, builders, 49, West Street.

Slough.—Two factories, Buckingham Avenue; Slough Estates, Ltd.

Smethwick.—Factory, Rolfe Street; T. Foden Flint & Sons. Extensions to works, Windmill Lane; Payne & Griffiths.

Southgate.—Baths, Winchmore Hill Road (£35,000); borough engineer.

Stamford.—Houses (88), Little Casterton site; F. R. Ryman, borough surveyor.

Staveley.—Houses (93), and bungalows; E. A. Tomlinson, builder, Beighton, near Chesterfield.

Stockport.—Maternity wards at the Stepping Hill Hospital; Fairhurst & Son, architects, 55, Brown Street, Manchester.

Stoke-on-Trent.—Houses (78), Hanford estate (£27,640); G. & J. Seddon, Ltd.

Swadlincote.—Houses (30), near Barklands Road; Parker Bros., builders. Market place development scheme, including town hall, market and bus station, &c. (£44,300); T. C. Howitt, architect, Exchange Buildings East, Nottingham.

Thrapston.—Clothing factory, Market Road; Ideal Clothiers, Ltd., Wellingborough.

Twickenham.—Flats (104), Cambridge Road; E. Simmons, architect, Palace Chambers, Bridge Street, London, S.W.1.

Upper Norwood.—Houses (62), Convent Hill; R. T. Grove, Lincluden, Beaumont Road, London, S.W.19.

Wakefield.—Houses (100); city housing director.

Warrington.—Houses (174), Council estates (£80,000); Daniel Cooper. Houses and shops near Longford Street and Lilford Avenue, for Greenwood Bros., Lostock Avenue.

Willenhall.—Houses (99), (£34,460); J. Hickin & Sons, builders, Rose Hill.

Wood Green.—Council offices; borough engineer.

Yiewsley.—Estate development, Sipson Road; Dunthorne & Shore.